ভারতবর্ষীয় বিজ্ঞান সভা।

ইহার সংক্ষেপবৃত্তান্ত ও অভাব।

শ্রীত্রৈলোক্য নাথ মুখোপাধ্যায়

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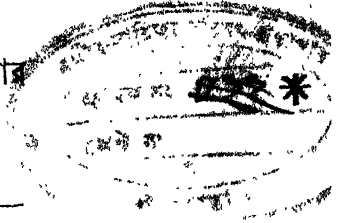
শ্রীঅমৃত লাল সরকার

কর্ত্তৃক সঙ্কলিত।

DIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE.

Its Short History and Urgent Needs.

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ভূমিকা।

ভারতবর্ষীয় বিজ্ঞান-সভা সম্বন্ধে বঙ্গবাসী সংবাদ পত্রে ইতি পূর্ব্বে কয়েকটী প্রবন্ধ প্রকাশিত হইয়াছিল। সেই প্রবন্ধ কয়টী স্বতন্ত্রভাবে মুদ্রিত করিয়া এস্থানে সন্নিবেশিত হইল। ডাক্তার মহেন্দ্রলাল সরকার মহাশয় বিজ্ঞান শাস্ত্র আলোচনা সম্বন্ধে ইংরাজিতে যে সমুদয় বক্তৃতা করিয়াছিলেন, তাহারও কতকগুলি এস্থানে সন্নিবেশিত হইল।

দিন দিন শিক্ষিত ভদ্রসন্তানদিগের দশা কিরূপ হইতেছে, তাহা সকলেই প্রত্যক্ষ দেখিতেছেন। কলিকাতার নিকটবর্ত্তী অনেকস্থানে সামান্য একজন মজুরের মাহিনা দশ টাকা, কিন্তু রেলে হউক অথবা অন্য স্থানে হউক, এক জন শিক্ষিত ভদ্রযুবক সেই মাহিনায় একটী চাকরি পান না। সে দিন একজন ছাত্রবৃত্তি পাশকরা যুবক পাচক ব্রাহ্মণ হইবার নিমিত্ত ঘুরিয়া বেড়াইতেছিলেন। আমরা শুনিয়াছি যে একজন এফ্ এ পাশ করা ব্যক্তি কোন আপিসে দপ্তুরির কার্য্য করিতেছেন। ফলকথা, ভদ্রসন্তানগণকে পেটের জ্বালায় যে কুলিগিরি করিতে হইবে সেই লক্ষণ চারিদিকে প্রতীয়মান হইতেছে।

এখন উপায় কি? আধুনিক বিজ্ঞান-শাস্ত্র সমূহ শিক্ষা করা, আর সেই বিজ্ঞান-শাস্ত্র কৃষি ও কারুকার্য্যে নিয়োজিত করা, তাহাই এ বিপদ সাগর হইতে উদ্ধার পাইবার এক মাত্র তরণী স্বরূপ। ইতি পূর্ব্বে এই বঙ্গদেশে ঈশ্বর চন্দ্র বিদ্যাসাগর, রাজেন্দ্রলাল মিত্র, কৃষ্ণদাস পাল প্রভৃতি অনেকগুলি উচ্চমনা, ভবিষ্যৎ-দৃষ্টি-সম্পন্ন মহাত্মা জন্মগ্রহণ করিয়াছিলেন। দেশের মঙ্গলের নিমিত্ত ডাক্তার মহেন্দ্র লাল সরকার মহাশয়ও জীবন সমর্পণ করিয়াছেন। আধুনিক বিজ্ঞান শাস্ত্রের আলোচনা ব্যতীত আমাদের আর অন্য উপায় নাই, এইরূপ ভাবিয়া সরকার মহাশয় এই বিজ্ঞান সভা স্থাপিত করিয়াছেন। সরকার মহাশয় এখন পীড়িত হইয়া কষ্টে কালাতিপাত করিতেছেন। তবুও এখনও তিনি বিজ্ঞান সভার জন্য ঘোরতর পরিশ্রম করিতেছেন। কিন্তু এ অবস্থায় তাঁহার নিকট হইতে অধিক প্রত্যাশা করিতে পারা যায় না। সুতরাং তিনি ও অন্যান্য মহাত্মাগণ যে সমুদয় কার্য্যের সূচনা করিয়াছেন, সে সমুদয় কার্য্য যাহাতে ভালরূপে সম্পাদিত হয়, সে চেষ্টা বর্ত্তমান কালের যুবকদিগের করা কর্ত্তব্য।

পূর্ব্ব পুরুষদিগের কীর্ত্তি অক্ষয় রাখিতে কর্ত্তব্য-পরায়ণ পুত্রগণের যেরূপ চেষ্টা করা উচিত, সেইরূপ গতকালপ্রসূত মহাত্মাদিগের কার্য্যকলাপ অক্ষয় রাখিতে বর্ত্তমান কালের যুবকদিগের চেষ্টা করা কর্ত্তব্য। বিশেষতঃ এই বিজ্ঞান সভা, দেশের মঙ্গলের একমাত্র আশা ভরশা। এক্ষণে এই বিজ্ঞান সভার কিঞ্চিৎ পূর্ব্বপরিচয় এস্থলে প্রদান করিব।

আমাদের দেশে যাহাতে বিজ্ঞান শাস্ত্রের আলোচনা হয়, সেই সম্বন্ধে ১৮৬৯ খৃষ্টাব্দে অর্থাৎ তেত্রিশ বৎসর পূর্ব্বে, চিকিৎসা বিষয়ে একখানি মাসিক পত্রে, ডাক্তার মহেন্দ্র লাল সরকার এক প্রবন্ধ লিখিয়াছিলেন। ভারতবর্ষীয় বিজ্ঞান সভার ইহাই প্রথম সূচনা। তাঁহার উদ্দেশ্য যাহাতে কার্য্যে পরিণত হয়, সে জন্য পর বৎসর তিনি তিনটী প্রস্তাব করেন। সেই প্রস্তাবের মর্ম্ম এইরূপ।

(১) এ দেশে বিজ্ঞানশাস্ত্রের আলোচনার নিমিত্ত কলিকাতায় একটী সভা স্থাপিত হউক, এবং ভারতবর্ষের নানা স্থানে তাহার সহিত সংযোগে শাখা সভা সংস্থাপিত হউক।

(২) ভারতের লোককে নানাবিধ বিজ্ঞান শাস্ত্রে শিক্ষা প্রদান করা এই সভার উদ্দেশ্য হইবে। বিজ্ঞান শাস্ত্র সম্বন্ধে ভারতে যে সমুদয় প্রাচীন পুস্তক আছে, তাহাও প্রকাশিত করা এ সভার আর একটী উদ্দেশ্য হইবে।

(৩) এই সভার নিমিত্ত গৃহ, নানারূপ যন্ত্র, ও কার্য্য সম্পাদনের নিমিত্ত লোকের আবশ্যক। ইহার জন্য অর্থের প্রয়োজন। চাঁদা স্বরূপ সেই অর্থ সাধারণের নিকট হইতে সংগৃহীত হউক।

এই সভায় কি কি শাস্ত্র আলোচিত হইবে, ও কি কি উপায় অবলম্বন করিলে সভার কার্য্য সুচারুরূপে নির্ব্বাহিত হইবে, ইহার পর সেই সম্বন্ধে সরকার মহাশয় কলিকাতা, উত্তরপাড়া প্রভৃতি নানাস্থানে বক্তৃতা করেন, ও সেই বক্তৃতায় তাঁহার উদ্দেশ্য অতি বিশদভাবে সাধারণকে বুঝাইয়া দেন। সংবাদপত্র সমূহেও এই বিষয় সম্বন্ধে তিনি কয়েকটী প্রবন্ধ লেখেন। সেই সমুদয় বক্তৃতা শ্রবণ ও প্রবন্ধ পাঠ করিয়া দেশের অনেক বড়লোকদিগের মনে একান্ত বিশ্বাস হয় যে, ভারতবর্ষের রাজধানী কলিকাতায় বৃহৎ এক বিজ্ঞানালয় সংস্থাপনের সময় উপস্থিত হইয়াছে। এই উদ্দেশ্য কার্য্যে পরিণত করিবার নিমিত্ত অনেক ধনবান লোক চাঁদা দিতে স্বীকৃত হইলেন। বঙ্গদেশের তাৎকালীন ছোটলাট সাহেবও সরকার মহাশয়কে এই কার্য্যে উৎসাহিত করিলেন। তাহার পর যে যে মহোদয়গণ এই কার্য্যে সহানুভূতি প্রকাশ করিয়াছিলেন,

১৮৭৫ সালের ৪ঠা এপ্রেল তারিখে তাঁহারা একটী সভা করিলেন। বিজ্ঞান সভায় কি কি বিষয় আলোচিত হইবে, সেই সম্বন্ধে এই সভায় সরকার মহাশয় আর একটী সুদীর্ঘ বক্তৃতা করিলেন। সেই বক্তৃতা শ্রবণ করিয়া উপস্থিত সভ্যগণ সত্বর এই সদনুষ্ঠান কার্য্যে পরিণত করিবার নিমিত্ত কৃতসংকল্প হইলেন। এই কার্য্যে যাঁহারা সহানুভূতি প্রকাশ করিয়াছিলেন ও চাঁদা দিতে স্বীকার করিয়াছিলেন, ইহার পর তাঁহারা আরও দুইটী সভা করিয়া বিজ্ঞান সভা স্থাপন সম্বন্ধে নানা বিষয়ের আলোচনা করিয়াছিলেন। অবশেষে ১৮৭৬ সালের জানুয়ারি মাসের ১৬ তারিখে, উদ্যোগীগণের তৃতীয় সভার অধিবেশন হয়। এই সভায় বঙ্গদেশের প্রায় সমস্ত গণ্য মান্য লোক উপস্থিত ছিলেন। বঙ্গদেশের ছোটলাট সাহেব এই সভায় সভাপতির আসন গ্রহণ করিয়াছিলেন। সেই দিন উপস্থিত সভ্যগণ একবাক্য হইয়া ভারতবর্ষীয় বিজ্ঞান সভা সংস্থাপন করিলেন। সভাদ্বারা কি কি কার্য্য সম্পাদিত হইবে ও কোন্ কোন্ ব্যক্তি ইহার কর্ম্মচারীরূপে কার্য্য করিবেন, এই অধিবেশনে সে সমুদয় বিষয়ও স্থির হইল।

বিজ্ঞান সভা এইরূপে সংস্থাপিত হইল। এস্থানে একটী কথা বলিয়া রাখি। অনেকের ধারণা এই যে, বিজ্ঞান সভার যাহা কিছু সম্পত্তি আছে তাহার সত্ত্বাধিকারী সরকার মহাশয় নিজে, আর তাঁহার পরলোকগমনে এই সমুদয় সম্পত্তি তাঁহার উত্তরাধিকারিগণের হস্তগত হইবে। এরূপ ধারণা নিতান্ত অমূলক। বিজ্ঞান সভা এবং ইহার সমুদয় সম্পত্তি সাধারণের; সরকার মহাশয়ের নিজের নহে। সাধারণের পক্ষ হইতে কতকগুলি সম্ভ্রান্ত লোক ট্রষ্টি নিযুক্ত হইয়াছেন। ত্রিশ কোটি ভারতবাসীদিগের প্রতিনিধি স্বরূপ তাঁহারাই সভার সম্পত্তির অধিকারী ও তাঁহারাই সভার তত্ত্বাবধারণ করিতেছেন।

সভা সংস্থাপনের কিছু দিন পরে সেই সময়ের ছোট লাট সার রিচার্ড টেম্পল সাহেব, এক মন্তব্য প্রকাশ করিলেন। বঙ্গদেশের লোক যদি এককালীন ৭০,০০০ টাকা ও মাসিক ১০০ টাকা চাঁদা সংগ্রহ করিতে পারে, তাহা হইলে গবর্ণমেণ্ট বিজ্ঞান সভার জন্য কয়েক বৎসরের নিমিত্ত একটী বাটী প্রদান করিবেন, ছোট লাট্ সাহেব এইরূপ ইচ্ছা প্রকাশ করিলেন। আহ্লাদের বিষয় এই যে বঙ্গদেশের ধনবান ও শিক্ষিত লোকগণ গবর্ণমেণ্টের ইচ্ছানুরূপ কার্য্য করিতে স্বীকৃত হইলেন। তাঁহাদের উদ্যোগে বিজ্ঞান সভা এক্ষণে বৃহৎ এক অট্টালিকায় প্রতিষ্ঠিত হইয়াছে। অট্টালিকার মধ্যে বৃহৎ একটি হল আছে, তাহাতে প্রায় পাঁচশত লোক উপবেশন করিয়া

বিজ্ঞানবিৎ পণ্ডিতগণের বক্তৃতা শ্রবণ করিতে পারেন। পরীক্ষার নিমিত্ত নানারূপ বহুমূল্য বৈজ্ঞানিক যন্ত্র সংগৃহীত হইয়াছে। বৈজ্ঞানিক পরীক্ষার নিমিত্ত একটী পরিক্ষাগার (Laboratory) নির্ম্মিত হইয়াছে। এই পরীক্ষা-গার নির্ম্মাণের জন্য বিজয়নগরের মহারাজ চল্লিশ হাজার টাকা প্রদান করিয়াছেন। বিজ্ঞান সম্বন্ধে নানারূপ পুস্তক ও মাসিক পত্রিকা প্রভৃতি ক্রীত হইয়াছে ও হইতেছে। জন কয়েক দেশহিতৈষী পণ্ডিত নিয়মিতরূপে প্রতিদিন সাধারণকে নানাশাস্ত্র সম্বন্ধে শিক্ষা প্রদানে ব্রতী হইয়াছেন। সভার উপস্থিত কার্য্য নির্ব্বাহের নিমিত্ত প্রতিমাসে প্রায় দুই শত টাকা খরচ হইয়া থাকে। সাধারণের নিকট হইতে চাঁদা লইয়া সেই চাঁদার টাকা কার্য্যাধ্যক্ষগণ কিরূপ পরিমিতভাবে ও বিচক্ষণতার সহিত ব্যবহার করিয়াছেন, তাহা শুনিলে আশ্চর্য্যান্বিত হইতে হয়। এককালীন দান ও মাসিক চাঁদা স্বরূপ কার্য্যাধ্যক্ষগণ প্রায় আড়াই লক্ষ টাকা সংগ্রহ করেন। উক্ত টাকার সুদ লাভ করিয়া, ও বিজ্ঞানালয়ের বহির্ভাগ ভাড়া দিয়া, তাঁহারা মূলধন অনেক বৃদ্ধি করিতে সমর্থ হইয়াছিলেন। বিজ্ঞানালয়ের বাটী খরিদ, পরীক্ষাগার নির্ম্মাণ, যন্ত্র ও পুস্তক ক্রয়, প্রভৃতি নানা বিষয়ে কার্য্যাধ্যক্ষগণ দুই লক্ষ চৌত্রিশ হাজার টাকা ব্যয় করিয়াছেন। ইহা ব্যতীত এখনও সভার প্রায় দেড়লক্ষ টাকা মূলধন জমা আছে। এই টাকায় ট্রষ্টিদিগের নামে কোম্পানি কাগজ ক্রীত হইয়াছে। কার্য্যাধ্যক্ষগণ সাধারণের নিকট হইতে প্রায় আড়াই লক্ষ টাকা পাইয়াছিলেন, কিন্তু সভার সম্পত্তির মূল্য এক্ষণে প্রায় সাড়ে চারি-লক্ষ টাকা। ১৮৭৬ সাল হইতে ১৯০২ সাল পর্য্যন্ত বিজ্ঞান সভার আয় ব্যয়ের হিসাব এই পুস্তকের শেষে প্রদত্ত হইল।

এক জন বাঙ্গালির উদ্যোগে ও অনেকগুলি মহাত্মার সহায়তায় যে এতদূর কার্য্য হইয়াছে তাহা আনন্দের বিষয় বটে। কিন্তু প্রকৃত কার্য্য এখনও অনেক বাকি রহিয়াছে। আধুনিক বিজ্ঞান শাস্ত্রকে যে ভাবে কৃষিকার্য্য ও কারুকার্য্যে নিয়োজিত করিয়া অন্যান্য দেশের লোক বিপুল সম্পত্তির অধীশ্বর হইয়াছেন, আমাদিগকেও এক্ষণে সেই জ্ঞান সংগ্রহ করিতে হইবে। এই বিজ্ঞান সভার দ্বারাই সেই কার্য্য সুচারুরূপে নির্ব্বাহিত হইতে পারিবে। নানারূপ পরীক্ষা না করিলে নূতন বিষয় আবিষ্কৃত হয় না। নারিকেল তৈল হইতে মাখন ও আলকাতরা হইতে নীল প্রভৃতি কোটি কোটি টাকার বস্তু অনেক পরিশ্রম, অনেক পরীক্ষা ও অনেক ব্যয় করিয়া অন্যান্য দেশের লোক প্রস্তুত করিতে সমর্থ হইয়াছে। বিজ্ঞান সভা যাহাতে এইরূপ পরীক্ষায় প্রবৃত্ত হইতে

পারে আমাদের এক্ষণে সেই চেষ্টা করা কর্ত্তব্য। এইরূপ পরীক্ষার জন্য বিজ্ঞানবিৎ কর্ম্মচারীর আবশ্যক। সেই পণ্ডিতগণ যাহাতে এই কার্য্যে এক মনে দিবারাত্রি পরিশ্রম করিতে পারেন, সেইরূপ আয়োজন করিতে হইবে। অর্থাৎ যাহাতে তাঁহাদের অন্নের চিন্তা না থাকে, সেইরূপ বেতন তাঁহাদিগকে প্রদান করিতে হইবে। খনিজ শাস্ত্র, উদ্ভিদ শাস্ত্র, রসায়ন, তাড়িত, কৃষি-কার্য্য, কারু-কার্য্য, এইরূপ এক একটী বিষয়ে এক একজন বিজ্ঞানবিৎ পণ্ডিত নিয়োজিত থাকা আবশ্যক। তাহার পর পরীক্ষার নিমিত্ত দ্রব্যাদির আবশ্যক, এবং বিজ্ঞান সম্বন্ধে সাধারণকে শিক্ষা দিবার নিমিত্ত বঙ্গভাষায় একখানি মাসিক পত্রের আবশ্যক। ফল কথা, ভালরূপ কার্য্য করিতে হইলে এখনও অনেক টাকার প্রয়োজন। একবারে এত টাকা সংগৃহীত হওয়া সম্ভব নহে। কিন্তু তা বলিয়া নিশ্চিন্ত হইয়া বসিয়া থাকাও উচিত নহে। প্রথমতঃ যতই সামান্যভাবে হউক না কেন, কার্য্য আরম্ভ করা উচিত। যেমন আয় হইবে, সেইরূপ বুঝিয়া একটী কি দুইটী বিষয় লইয়া কার্য্য আরম্ভ করা আবশ্যক। কিন্তু সকল কার্য্যের মূল টাকা, টাকা না হইলে কোন কার্য্য আরম্ভ হইবে না। যে রূপ দিন কাল পড়িয়াছে, তাহাতে অনেক টাকা খরচ না করিলে কোন কার্য্য সম্পন্ন হয় না। বোম্বাই প্রদেশবাসী পার্সি টাটা সাহেবের উদাম তাহার দৃষ্টান্ত। তেত্রিশ বৎসর পূর্ব্বে সরকার মহাশয় যে কার্য্যের সূচনা করিয়াছেন, সেই রূপ কার্য্যের অনুষ্ঠান করিতে মানস করিয়া টাটা সাহেব গবর্ণমেণ্টের হস্তে ত্রিশ লক্ষ টাকার সম্পত্তি প্রদান করিতে ইচ্ছা প্রকাশ করেন। কিন্তু অনেক অনুসন্ধান করিয়া গবর্ণমেণ্ট অবগত হইলেন যে ত্রিশ লক্ষ অতি সামান্য টাকা, ইহাতে আধুনিক বিজ্ঞান শাস্ত্রের আলোচনা ও পরীক্ষা সম্বন্ধে কোন কার্য্যই হইতে পারে না। অবশেষে এক্ষণে স্থির হইয়াছে যে এই কার্য্য আরম্ভ করিবার নিমিত্ত টাটা সাহেবের ত্রিশ লক্ষ টাকা ব্যতীত মহিসূরের মহারাজা এগার শত বিঘা ভূমি, পাঁচ লক্ষ টাকা এক কালীন দান, ও দশ বৎসরের নিমিত্ত বাৎসরিক পঞ্চাশ হাজার টাকা চাঁদা দিবেন, ও গবর্ণমেণ্ট এক কালীন এক লক্ষ টাকা ও দশ বৎসরের নিমিত্ত বাৎসরিক পঞ্চাশ হাজার টাকা প্রদান করিবেন। অট্টালিকা প্রভৃতি নির্ম্মাণের নিমিত্ত ছয় লক্ষ টাকা ও তাহার পর বাৎসরিক দুইলক্ষ টাকা খরচ করিতে গবর্ণমেণ্ট মানস করিয়াছেন। সর্ব্বসুদ্ধ বায়াত্তর লক্ষ টাকা মূল ধনের আবশ্যক। ইহাতেও যে কার্য্য সুচারু রূপে সম্পন্ন হইবে গবর্ণমেণ্ট তাহা বিবেচনা করেন না। বঙ্গ-

দেশের ধনবান লোকগণ এই রূপ কার্য্যের নিমিত্ত সরকার মহাশয়ের হস্তে কেবল প্রায় আড়াই লক্ষ টাকা দিয়াছিলেন। এই সামান্য টাকায় সরকার মহাশয় যে এত দূর করিতে সমর্থ হইয়াছেন তাহাই আশ্চর্য্যের বিষয়। যাহা হউক সামান্য ভাবে কার্য্য করিতে হইলে ও আর ও টাকার আবশ্যক। কিন্তু আর নিশ্চিন্ত থাকা উচিত নহে। এই হিতকর কার্য্যে সকলেরই মনোযোগ করা আবশ্যক। দেশে যত শিক্ষিত লোক আছেন, তাঁহাদের প্রতিজনে বৎসরে যদি এক টাকা করিয়া চাঁদা প্রদান করেন, তাহা হইলেও কার্য্য আরম্ভ হইতে পারিবে। তাহার পর ভবিষ্যতে আমাদের পুত্র পৌত্রগণের যে কিরূপ শোচনীয় দুর্দ্দশা হইবে, যাঁহারা সেইকথা ভালরূপ হৃদয়ঙ্গম করিতে পারিবেন, বিজ্ঞান সভার জন্য লজ্জা ঘৃণাকে জলাঞ্জলি দিয়া তাঁহাদিগকে দ্বারে দ্বারে ভিক্ষাও করিতে হইবে। অন্নপ্রাশন, উপনয়ন, বিবাহ প্রভৃতি শুভ কার্য্যে যাঁহারা শত শত টাকা ব্যয় করেন, বিজ্ঞান সভার নিমিত্ত তাঁহাদের দ্বারে গিয়া দাঁড়াইলে, তাঁহারা বোধ হয় নিরাশ করিবেন না। আমাদের নিশ্চয় বিশ্বাস এই যে যত্ন করিলেই কার্য্য সিদ্ধ হইবে। সেই যত্নের নিতান্ত প্রয়োজন। স্বদেশের, স্বজাতির, আপনাদের নিজের পুত্র পৌত্র, সকলের মঙ্গলের নিমিত্ত, আজ কৃতাঞ্জলি হইয়া দেশের শিক্ষিত লোকদিগের নিকট আমরা সেই যত্ন ভিক্ষা করিতেছি। যিনি যতটুকু পারেন তিনি ততটুকু চেষ্টা করুন ইহাই আমাদের একান্ত প্রার্থনা।

শ্রীত্রৈলোক্য নাথ মুখোপাধ্যায়।

শ্রী অমৃত লাল সরকার।

বিজ্ঞানালয়, ২১০ বহুবাজার ষ্ট্রীট,

কলিকাতা।

১৮ই ভাদ্র, ১৩১০ সাল।

ভারতবর্ষীয় বিজ্ঞান সভার আয় ব্যয়ের হিসাব।

ইংরেজি ১৮৭৬ শাল হইতে ১৯০২ শাল পর্য্যন্ত।

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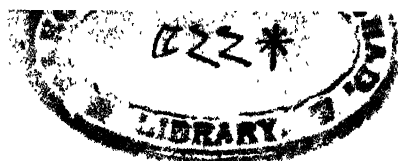
বিজ্ঞান-আলয়।

প্রথম প্রস্তাব।

মূল পদার্থ।

পূর্ব্বে যে সমুদয় দ্রব্য উদ্ভিদ্ অথবা পশু শরীরে উৎপন্ন হইত, মানুষ এখন সেই সমুদয় বস্তু কৃত্রিম প্রস্তুত করিতে সমর্থ হইয়াছে। কৃত্রিম চিনি, ইক্ষু চিনি অপেক্ষা আড়াই শত গুণ মিষ্ট। কৃত্রিম নীল, উদ্ভিদ-জাত নীলের ব্যবসাকে মাটি করিতে বসিয়াছে। কৃত্রিম ম্যাজেণ্টা রং লাক্ষা, কুসুম, আচ প্রভৃতি রঙের ব্যবসাকে একেবারে লোপ করিয়াছে। বাজারে যে নানারূপ বিলাতী সুগন্ধযুক্ত এসেন্স বিক্রীত হয়, তাহার অধিকাংশ কৃত্রিম। ফল কথা পূর্ব্বে যাহা ঈশ্বরের কার্য্য বলিয়া পরিগণিত ছিল, মানুষ এখন সেইরূপ কাজ করিতে সমর্থ হইয়াছে।

আধুনিক বিজ্ঞানবলে মানুষ এই সমুদয় কাজ করিতে সমর্থ হইয়াছে। সহস্র সহস্র বৎসর পূর্ব্বে এই ভারতবর্ষে নানারূপ বিজ্ঞানের সূচনা হয়। তাহার পর এ দেশের লোক মনে করিল যে,—"যাহা আমরা আবিষ্কার করিয়াছি, তাহাই চূড়ান্ত, ইহার উপর আর উন্নতি হয় না।" এইরূপ ভাবিয়া আমাদের দেশের লোক আর কোনরূপ উন্নতি কবিতে চেষ্টা করিল না। উন্নতি করিবার চেষ্টা, বলিতে গেলে, দেড় শত বৎসর পূর্ব্বে কোন দেশেই ছিল না। যত কিছু ভাল ভাল নূতন আবিষ্কার হইয়াছে, তাহা এই দেড় শত বৎসরের ভিতরেই হইয়াছে।

প্রথম, মানুষ দেখিল যে, পৃথিবীর কোন পদার্থ একেবারে ধ্বংস হয় না,—রূপান্তর হয়, এই মাত্র। আগুনে আমি কাঠ, কি বাতি, কি তৈল জ্বালাইলাম; সে কাট, বাতি ও তৈল লোপ পাইল। লোপ পাইল? না,—তাহারা লোপ পাইল না, তাহাদের রূপান্তর হইল—অর্থাৎ তাহারা অন্য বস্তুতে পরিণত হইল। সে বস্তুর আকার বায়ুর মত। সে জন্য তাহা আমরা চক্ষে দেখিতে পাই না। অদৃশ্যভাবে সে বস্তু আশে পাশের বায়ুর সহিত মিশিয়া যায়। কিন্তু কাঠ, কি কয়লা, কি তৈল পুড়িয়া নূতন একটী পদার্থ যে উৎপন্ন হয়, সে বিষয়ে আর কোন সন্দেহ নাই। কারণ এই নূতন বায়ুর ন্যায় পদার্থটী ভয়ানক বিষ। ঘরের দ্বার ও জানালা বন্ধ করিয়া কয়লা জ্বালাইলে ঘরটী এই বিষময় পদার্থে পরিপূর্ণ হইয়া যায়, আর সে ঘরে যত মানুষ থাকে, তাহারা সব মরিয়া যায়। এই বিষ নিশ্বাসের সহিত গ্রহণ করিয়া প্রতি বৎসর কলিকাতা সহরে অনেক লোক মারা পড়ে। আঁতুড় ঘরে গুলের ধূমেও প্রতি বৎসর অনেক শিশু মৃত্যুমুখে পতিত হয়।

পৃথিবীর কোন বস্তু ধ্বংস হয় না। আগুনের তাপে কাঠ, কয়লা প্রভৃতি দাহ্য বস্তুর রূপান্তর হয়। বায়ুর সংযোগে, জলের সংযোগে, অম্ল দ্রব্যের সংযোগে, আরও নানা বস্তুর সংযোগে, বিশেষতঃ তাড়িত বলের সংযোগে, পৃথিবীর প্রায় সকল বস্তুর রূপান্তর হয়। পৃথিবীর সকল বস্তুর এইরূপ রাত্রিদিন রূপান্তর হইতেছে, আবার পুনর্ব্বার গঠিত হইতেছে।

এ রূপান্তরের অর্থ কি? আমার মত এই যে, এই বিশ্বব্রহ্মাণ্ডের যাবতীয় বস্তু কেবল একটী সূক্ষ্ম পদার্থ দ্বারা গঠিত হইয়াছে। কিন্তু এ কেবল অনুমান, ইহার কোন প্রমাণ নাই। সকল বস্তু যে একটী মূল পদার্থ হইতে উদ্ভূত হইয়াছে, তাহার প্রমাণ নাই বটে; কিন্তু পৃথিবীর যাবতীয় বস্তু যে ন্যূনাধিক সত্তরটী মূল পদার্থ হইতে উৎপন্ন

হইয়াছে, তাহার বিলক্ষণ প্রমাণ আছে। কারণ এই সত্তরটী বস্তু আমরা প্রত্যক্ষ দেখিতে পাই। বায়ু বল, মৃত্তিকা বল, প্রস্তর বল, উদ্ভিদ-শরীর বল, জীব শরীর বল, সমুদয় বস্তু, এই সত্তরটী মূল পদার্থ দিয়া গঠিত। এক সের ওজনের এক খণ্ড কাষ্ঠ লইলাম। এই কাষ্ঠখণ্ডকে দগ্ধ অর্থাৎ রূপান্তর করিলাম। যে যে মূল পদার্থ দ্বারা কাষ্ঠখণ্ড গঠিত, তাহারা পৃথক্ পৃথক্ হইয়া গেল। সেই সমুদায় পদার্থকে ওজন করিয়া দেখিলাম যে, ঠিক এক সের হইল। লৌহ, তাম্র, পারদ, রৌপ্য, স্বর্ণ, গন্ধক ইহারা মূল পদার্থ। কাষ্ঠকে পোড়াইলে তাহার ভিতর হইতে অনেকগুলি অন্য বস্তু বাহির হইয়া পড়ে; কিন্তু বিশুদ্ধ স্বর্ণকে পোড়াইলে তাহার ভিতর হইতে অন্য কোন বস্তু বাহির হয় না; সোণা সোণাই থাকিয়া যায়। সম্প্রতি আমার হাতে একটু সুবর্ণ ভস্ম পড়িয়াছিল। সে সুবর্ণ ভস্ম ঠিক অন্য ভস্মের ন্যায়। পয়সা দিয়া এরূপ সুবর্ণ ভস্ম ক্রয় করিতে কাহাকেও আমি পরামর্শ প্রদান করি না। কারণ, স্বর্ণকে চূর্ণ করিতে পারা যায়, একেবারে ভস্মে পরিণত করা যায় না। পারদ ও গন্ধক দিয়া লোকে মকরধ্বজ প্রস্তুত করে। সে পারদ ও গন্ধক কোথায় যায়? কাষ্ঠ পুড়িয়া যেরূপ ভস্ম হইয়া যায়, তাহারাও কি সেইরূপ ভস্ম হয়? কিছুতেই নয়। সে পারদ ও গন্ধক সূক্ষ্মভাবে মকরধ্বজেই রহিয়া যায়। কাঠ কি কয়লার ভস্ম হইতে আমরা কাঠ কি কয়লা পুনরায় বাহির করিতে পারি না; কিন্তু মকরধ্বজ হইতে আমরা পুনরায় পারা ও গন্ধক বাহির করিয়া লইতে পারি। লৌহ ও গন্ধক মিশ্রিত হইয়া হীরাকস, ও তাম্র ও গন্ধক মিশ্রিত হইয়া তুঁতিয়া হয়। হীরাকস হইতে লৌহ ও গন্ধক, ও তুঁতিয়া হইতে তাম্র ও গন্ধক বাহির করিতে পারা যায়; কিন্তু লৌহ অথবা গন্ধক হইতে অন্য কোন বস্তু বাহির করিতে পারা যায় না, কারণ ইহারা মূল পদার্থ।

হীরাকস ও তুঁতিয়ার ন্যায় জল ও দুইটী পদার্থ দিয়া গঠিত। এ দুইটী বায়ুর ন্যায় পদার্থ। দুইটী, বায়ুর ন্যায় পদার্থের সংযোগে তরল জল হইয়াছে। ইহাদের একটীর নাম অক্সিজেন, অপরটীর নাম হাইড্রোজেন। হাইড্রোজেন ও অক্সিজেন বায়ুর ন্যায় স্বচ্ছ, সে জন্য ইহাদিগকে আমরা চক্ষে দেখিতে পাই না। চক্ষে দেখিতে না পাইলেও যেরূপ বায়ুর বল আমরা বুঝিতে পারি, সেইরূপ হাইড্রোজেন ও অক্সিজেনের গুণ আমরা নানারূপে অনুভব করিতে পারি। অক্সিজেনের ভিতর জ্বলন্ত বাতি রাখিলে দাউ দাউ করিয়া পুড়িতে থাকে, এমন কি লৌহ পর্য্যন্ত পুড়িয়া চূর্ণ হইয়া যায়। অক্সিজেনের ভিতরে মানুষ রাখিলে তাহার নিশ্বাস-প্রশ্বাস ক্রিয়া এত দ্রুতবেগে সম্পাদিত হয় যে, সে মানুষ অবিলম্বে ভিতর ভিতর পুড়িয়া মৃত্যুমুখে পতিত হয়। এক সের জল লইয়া তাহার অক্সিজেন এক স্থানে ও হাইড্রোজেন অন্য স্থানে করিতে পারি। তখন সে দুইটী বস্তুকে বায়ুর ন্যায় দেখায়। তাহার পর সেই দুই বস্তুকে একত্র করিয়া পুনরায় সেই এক সের জলে পরিণত করিতে পারি। একত্র হইয়া সেই দুই বস্তু তরল পদার্থ হয়, অর্থাৎ জল হয়।

হীরাকসের লৌহ ও গন্ধক পৃথক করিতে পারি, আবার তাহাদিগকে যোগ করিয়া হীরাকস করিতে পারি। তুঁতিয়ায় তামা ও গন্ধক পৃথক্ করিতে পারি, আবার সেই দুই বস্তুকে যোগ করিয়া তুঁতিয়া করিতে পারি। জলের হাইড্রোজেন ও অক্সিজেন পৃথক্ করিতে পারি, আবার সেই দুই বস্তুকে যোগ করিয়া জল করিতে পারি। কিন্তু পৃথিবীর সকল বস্তুর উপাদানকে এরূপ অনায়াসে পৃথক্ করিতে পারা যায় না। পৃথক্ করিতে পারিলেও তাহাদিগকে যোগ করিয়া পুনরায় সেই পূর্ব্ব বস্তুতে পরিণত করিতে পারি না। উদ্ভিদ্ ও প্রাণী শরীর, ও জীব শরীরে যাহা উৎপন্ন হয়, এরূপ বস্তুকে ভিন্ন ভিন্ন উপাদানে পৃথকীভূত করা বড়ই কঠিন কাজ। তাহার পর,

কোন্ বস্তুর কি উপাদান তাহা জানিলেও সেই সমুদয় উপাদান দিয়া সেই বস্তু সৃজন করা আরও কঠিন কাজ। কিন্তু জর্ম্মানী প্রভৃতি দেশে নিয়তই এই চেষ্টা হইতেছে, আর সেই চেষ্টার বলে, বিটচিনি ইক্ষু-চিনিকে পরাজয় করিতে সমর্থ হইয়াছে। সেই চেষ্টার বলে কুৎসিত আল্‌কাতরা হইতে মেজেণ্ডার রং প্রস্তুত হইয়াছে। সেই চেষ্টার বলে ইউরোপ মহাদেশের লোক কোটি কোটি টাকা লাভ করিতে সমর্থ হইয়াছে। এখানেও যাহাতে সেইরূপ চেষ্টা হয়, সেই উদ্দেশে সুপ্রসিদ্ধ বিজ্ঞানবিৎ ডাক্তার শ্রীযুক্ত মহেন্দ্রলাল সরকার মহাশয় বিজ্ঞানালয় স্থাপিত করিয়াছেন। এই বিজ্ঞানালয়ে কিরূপ কাজ হইতে পারিবে ও কি উপায়ে সরকার মহাশয়ের মনোরথ সিদ্ধ হইবে, তাহা পরে বলিব।

দ্বিতীয় প্রস্তাব।

বিজ্ঞানের মাহাত্ম্য।

ইতিপূর্ব্বে আমি মূল পদার্থের কথা বলিতেছিলাম। পৃথিবীর যাবতীয় পদার্থ ন্যূনাধিক সত্তরটী মূল পদার্থ দিয়া গঠিত। কেবল পৃথিবী নহে,—সূর্য্য, চন্দ্র, গ্রহ, নক্ষত্র, এই বিশ্ব-ব্রহ্মাণ্ডের যাহা কিছু আমরা দেখিতে পাই, সে সমুদয় এই কয়টী মূল পদার্থ দিয়া গঠিত। কোটি কোটি ক্রোশ দূরস্থিত নক্ষত্র প্রভৃতি কি দ্রব্য দিয়া গঠিত, তাহা কি করিয়া আমরা জানিতে পারিলাম? সে কথা এখানে বলিবার স্থান নাই। তবে এখন কেবল এই মাত্র বলিতে পারি যে, এ অনুমান নহে, প্রত্যক্ষ প্রমাণ বলিলেও চলে।

সত্তরটী মূল পদার্থ দ্বারা পৃথিবী গঠিত বটে, কিন্তু ইহার সকলগুলি অধিক পরিমাণে নাই। স্বর্ণ, রৌপ্য, লৌহ পারদ প্রভৃতি ধাতু ব্যতীত, আর কেবল গুটিকত পদার্থ আমরা সচরাচর দেখিতে পাই ও

সচরাচর ব্যবহার করি। যে কয়টী পদার্থ আমরা সচরাচর ব্যবহার করি, তাহাদের মধ্যে চারিটী পদার্থের নাম না করিলে চলে না। কারণ ধাতু ব্যতীত যাহা কিছু আমরা ব্যবহার করি, সে সমুদয় এই চারিটী পদার্থ দ্বারা গঠিত। এই চারিটী পদার্থের নাম—অক্সিজেন, নাই-ট্রোজেন, হাইড্রো ন ও কার্ব্বণ। প্রথম তিনটী বায়বীয় পদার্থ, অর্থাৎ বায়ুর ন্যায়। কার্ব্বণ,—কয়লার ন্যায়। সেজন্য বাঙ্গালায় কেহ কেহ ইহার নাম "অঙ্গার" দিয়াছেন। আমরা যে নিশ্বাস লই, তাহা অক্সিজেন ও নাইট্রোজেন। অক্সিজেন জীবের জীবন, কারণ অক্সিজেন নিশ্বাস না লইলে জীব মরিয়া যায়। আমরা যে বায়ু নিশ্বাস লই, চাপ দিয়া তাহাকে জলের ন্যায় তরল করিতে পারা যায়, এবং বরফের ন্যায় কঠিন করিতে পারা যায়। সে তরল বায়ু এত শীতল যে, যেমন আগুনে হাত পুড়িয়া যায়, তেমনি তাহার শীতলতায় হাত পুড়িয়া যায়।

অক্সিজেন ও হাইড্রোজেন এই দুই বায়বীয় পদার্থের সংযোগে জল হইয়াছে। জলকে বিচ্ছিন্ন করিয়া এই দুই পদার্থে পরিণত করিতে পারা যায়। এই দুই পদার্থকে যোগ করিয়া পুনরায় কি জল করিতে পারা যায়? হাঁ, তাহা করিতে পারা যায়। কার্ব্বণ, অর্থাৎ কয়লা দ্বারা বহুমূল্য হীরক গঠিত। কার্ব্বণ দিয়া আমরা কি হীরক করিতে পারি? হাঁ, কতক পরিমাণে তাহা আমরা করিতে পারি; কিন্তু ভালরূপ নহে।

উদ্ভিদ্ ও জীব-দেহ, প্রধানতঃ অক্সিজেন, হাইড্রোজেন, নাইট্রোজেন ও কার্ব্বণ দিয়া গঠিত। অর্থাৎ; আমাদের খাদ্য-সামগ্রী, পরিধেয় বস্ত্র, তৈল, ঘৃত, রং, সুগন্ধ, প্রভৃতি যাবতীয় বস্তু, এই কয়টি পদার্থ দিয়া গঠিত। যদি এই কয়টি পদার্থ দ্বারা চাউল, গম, দাল, সরিষা প্রভৃতি সমুদয় বস্তু গঠিত, তাহা হইলে ইহাদিগকে যোগ করিয়া আমরা চাউল প্রভৃতি বস্তু প্রস্তুত করিতে পারি? না, তাহা আমরা

এখনও পারি না। তাহার কারণ এই যে, কোন্ বস্তুতে কি কি পদার্থ কি ভাবে সজ্জিত আছে, তাহা আমরা ভালরূপ জানি না। যে লোক অট্টালিকা নির্ম্মাণের কাজ একেবারেই জানে না, তাহাকে যদি একটী অট্টালিকা নির্ম্মাণ করিতে হয়, তাহা হইলে সে কি করিবে? প্রথম তাহাকে দেখিতে হইবে যে, অট্টালিকা কি কি বস্তু দিয়া প্রস্তুত হয়। কেহ যদি তাহাকে একথা বলিয়া দিতে না পারে, আর চারিদিকে যদি বৃথা অনেক অট্টালিকা পড়িয়া থাকে, তাহা হইলে সে অনেকগুলি অট্টালিকা ভাঙ্গিয়া দেখিবে যে, কি দিয়া তাহারা নির্ম্মিত। রাসায়নিক পণ্ডিতগণ ক্রমাগত এই কাজ করিতেছেন। পৃথিবীতে যত বস্তু আছে তাঁহারা ক্রমাগত ভাঙ্গিয়া দেখিতেছেন যে, তাহারা কি কি মূল পদার্থ দিয়া গঠিত। কিন্তু এ কাজ সামান্য নহে, অতি কঠিন কাজ। অট্টালিকা ভাঙ্গিয়া দেখিলাম যে, ইট, চুণ, সুর্‌কি, কাঠ, লৌহ প্রভৃতি বস্তু দিয়া গঠিত; কিন্তু কত চুণ, কত সুর্‌কি, কত ইট দিয়া গঠিত? তেমনি এক একটী পদার্থ কত অক্সিজেন, কত হাইড্রোজেন, কত নাইট্রোজেন, কত কার্ব্বণ দিয়া গঠিত? সে তত্ত্ব বাহির করা আবার আরও কঠিন কাজ। তাহার পর অট্টালিকা নির্ম্মাণ করিতে ইট কি ভাবে গাঁথিতে হইবে, কিসের পর কি দিতে হইবে? বস্তুসমূহের বিষয়ে এ জ্ঞান লাভ করা আরও বিষম কাজ। কারণ মুল পদার্থের পরমাণু আমরা চক্ষে দেখিতে পাই না।

এইরূপ নানা কারণে, উদ্ভিদ্ ও জীবদেহ কি কি মূলপদার্থ দ্বারা গঠিত হইয়াছে, তাহা জানিতে পারিলেও সে সমুদয় পদার্থ যোগ করিয়া আমরা উদ্ভিদ্ ও জীবদেহ সৃজন করিতে পারি না। পরমাণুর সংযোগে এ সমুদয় বস্তু সৃজন করা যে মানুষের সাধ্য, একশত বৎসর পূর্ব্বে যদি কেহ সে কথা বলিত, তাহা হইলে লোকে তাহাকে পাগল বলিয়া উপহাস করিত। কিন্তু বিজ্ঞানবিৎ পণ্ডিতগণ এখন বুঝিয়াছেন যে, এ কাজ মানুষের সাধ্যাতীত নহে। ফল কথা, কি বস্তু কি দিয়া

গঠিত, তাহা জানিতে আর সেই বস্তু তাই দিয়া সৃজন করিতে, ক্রমাগত চেষ্টা হইতেছে। আর এ পর্য্যন্ত এ চেষ্টা সম্পূর্ণ বিফল হয় নাই। আমি পূর্ব্বেই বলিয়াছি যে, এই চেষ্টার ফলে ইউরোপের লোক নানা প্রকার রং ও সুগন্ধ প্রস্তুত করিয়া কোটি কোটি টাকা উপার্জ্জন করিতেছে। অন্যের কথা দূরে থাকুক, আমরাই অনেক টাকার চাউল প্রভৃতি কৃষিজাত দ্রব্য দিয়া সেই সমুদয় বস্তু ক্রয় করিতেছি। লক্ষ লক্ষ টাকার যে বিটচিনি এদেশে আমদানী হয়, সে বিট কি? সে বিট এক প্রকার পালং শাকের গোড়া ব্যতীত আর কিছুই নহে। দেড়শত বৎসর পূর্ব্বে এই পালং শাকের গোড়া হইতে কেহ এক ছটাকও চিনি বাহির করিতে পারিত না। এখন এক মণ গোড়া হইতে সাত সের চিনি বাহির হইতেছে। ইক্ষু হেন সুমিষ্ট রস-সম্পন্ন দ্রব্যকেও বিট পরাজয় করিয়াছে। কিন্তু বলিতে গেলে বিট ইক্ষুকে পরাজয় করে নাই; ইউরোপবাসীদের বিদ্যা বুদ্ধি আমাদের বিদ্যা-বুদ্ধিকে পরাজয় করিয়াছে। সম্প্রতি সেই দেশের লোক কৃত্রিম নীল বাহির করিয়াছে। তাহাতে আমাদের ক্ষতি হইবে কি লাভ হইবে, সে বিচারে এখন আবশ্যক নাই। এখন কেবল এই কথা বলিতে পারা যায় যে, যে বস্তু ঈশ্বরসৃষ্ট উদ্ভিদ দেহে সঞ্চিত হইত, সে বস্তু এখন মানুষ ঘরে প্রস্তুত করিতেছে। মৃত্তিকা কি, ইহার অনুসন্ধান করিতে করিতে নূতন একটা ধাতু বাহির হইয়া পড়িল। সেই ধাতু রৌপ্যের ন্যায় উজ্জ্বল। এই ধাতু আর একটু শস্তা হইলেই, পিতল কাঁসার বাসন উঠিয়া যাইবে। আমাদের দেশ হইতে এবং অন্যান্য স্থান হইতে জর্ম্মানি দেশে অনেক শুষ্ক নারিকেলের শাঁস প্রেরিত হয়। তাহা হইতে সেস্থানের লোক চমৎকার মাখন প্রস্তুত করিতেছে। নারিকেল হইতে যদি ভাল মাখন হয়, তাহা হইলে ইহা হইতে ভাল ঘৃতও হইতে পারে। কিন্তু কি করিয়া করিতে হয় তাহা আমরা জানি না। নারিকেল তৈল উপকারী বস্তু। ঘৃত অপেক্ষা না হউক, কিন্তু ইহা বলকারক খাদ্য।

তবে গন্ধের নিমিত্ত কোন বস্তু ইহা দ্বারা পাক করিতে পারা যায় না। এ দেশে এমন উপকারক দ্রব্য থাকিতে, পচা চর্ব্বি দ্বারা-প্রস্তুত দুর্গন্ধযুক্ত ঘৃতের জ্বালায় লোক উৎপীড়িত হইয়াছে। নারিকেল তৈল হইতে যিনি ঘৃত প্রস্তুত করিতে পারিবেন, তিনি নিজে যে কেবল বড় মানুষ হইবেন তাহা নহে; তিনি দেশের লোককেও এক বিষম দায় হইতে উদ্ধার করিবেন।

কেবল যে রসায়ন শাস্ত্রের সহায়তায় মানুষ নূতন নূতন কাজ করিতে সমর্থ হইয়াছে, তাহা নহে। ভূতত্ত্ব-বিদ্যার সহায়তায়, কোথায় কয়লা আছে, কোথায় স্বর্ণ আছে মানুষ তাহা জানিতে পারিতেছে। তাড়িতবিদ্যার সহায়তায় মানুষ সূর্য্যের আলোক উৎপাদন করিতে সমর্থ হইয়াছে, আর লৌহ প্রভৃতি নানারূপ ধাতু সুলভ মূল্যে প্রস্তুত করিতেছে। যে সমুদয় কাজ পূর্ব্বে দেবতার কাজ বলিয়া পরিগণিত ছিল, মানুষ এখন সেই সকল কাজ করিতেছে। সুতরাং যাহারা এই সমুদয় কাজ করিতেছে, তাহারা দৈববলে বলীয়ান হইয়া পৃথিবীর অধীশ্বর হইতেছে। আর যাহারা এই সকল বিদ্যা অবগত নহে তাহারা পশুতুল্য হইয়া কষ্টে দিনপাত করিতেছে।

আমরা দরিদ্র হই, তাহাতে বিশেষ ক্ষতি নাই; কিন্তু পৃথিবীতে যে সমুদয় জ্ঞান সঞ্চিত হইয়াছে, তাহা হইতে যে আমরা বঞ্চিত হইয়া আছি, তাহাই বড় দুঃখের বিষয়। বিদ্যাই মানুষের বল, বিদ্যাই মানুষের অলঙ্কার। বিদ্যা ও বুদ্ধিবলেই মানুষ পশু অপেক্ষা উচ্চ আসনে আসীন হইয়াছে? সে বিদ্যা হইতে আমরা বঞ্চিত থাকিতে পারি না। যেমন করিয়া পারি, সে বিদ্যা আমাদিগকে শিক্ষা করিতে হইবে। বিদ্যায় যেন আমাদিগকে কেহ পরাজয় করিতে না পারে, সর্ব্বদা আমাদিগকে সেই চেষ্টা করিতে হইবে। বিদ্যা হইলে আমাদের ধন হইবে, আমাদের বল হইবে, আমাদের সম্মান হইবে, আমাদের সব হইবে।

এই নূতন বিদ্যা আমাদের দেশে আনিবার নিমিত্ত ডাক্তার শ্রীযুক্ত মহেন্দ্রলাল সরকার বিজ্ঞানালয় স্থাপিত করিয়াছেন। রসায়ন তাড়িত প্রভৃতি বিদ্যাবলে অন্যান্য দেশের লোক যে সমুদয় অলৌকিক কার্য্য-সাধনে সমর্থ হইয়াছে, আমাদের দেশের লোকও যাহাতে সেই সমুদয় কাজ করিতে পারে, এই বিজ্ঞানালয়ের তাহাই উদ্দেশ্য। কিন্তু এ এক জনের কাজ নহে, এ এক দিনের কাজ নহে। ক্রমাগত চেষ্টা, ক্রমাগত পরীক্ষা, দিনের পর দিন, মাসের পর মাস, বৎসরের পর বৎসর ক্রমাগত পরিশ্রম করিতে হইবে। তবে ইহা হইতে সুফল ফলিবে। সরকার মহাশয় বীজ বপন করিয়াছেন। সেই বীজ হইতে যে অঙ্কুর বাহির হইয়াছে, তাহাকে লালন পালন করিয়া ফলবান বৃক্ষে পরিণত করা এক জনের কাজ নহে। বিজ্ঞানালয়ের উদ্দেশ্য কি করিয়া সাধিত হইবে, সে বিষয়ের আলোচনা আমি পুনরায় করিব।

তৃতীয় প্রস্তাব।

স্বদেশের হিতকামনা।

সরকার মহাশয় কি উদ্দেশ্য সাধনের আশায় বিজ্ঞানালয় স্থাপিত করিয়াছেন, তাহা আমি পূর্ব্বে বলিয়াছি। সংসারে বাস করিতে হইলে তিনটী বিষয়ের নিতান্ত প্রয়োজন হয়,—(১) সুস্থ শরীর, (২) জ্ঞান, ও (৩) অর্থ। সত্য ও ঈশ্বরে ভক্তি, সকলের আগে প্রয়োজন। কিন্তু এ দুই বিষয়ে লোককে শিক্ষা দিবার নিমিত্ত ভারতে অনেকগুলি ধর্ম্ম প্রচলিত আছে ও অনেক ধর্ম্ম-প্রচারক আছেন। সে জন্য আমি এই সামান্য ইহজীবন সম্বন্ধে লোককে শিক্ষা দিতে প্রবৃত্ত হইয়াছি।

বিজ্ঞানালয়ের কার্য্য যদি সুচারুরূপে নির্ব্বাহিত হয়, তাহা হইলে সুস্থ শরীর, জ্ঞান ও অর্থ,—এই তিন বিষয় দ্বারাই ভারতের লোক ভূষিত হইতে পারে। পৃথিবী অনেক পরিবর্ত্তিত হইয়াছে ও দিন দিন পরিবর্ত্তিত হইতেছে। রঘুরাজের দিগ্বিজয় উপলক্ষে কালিদাস, দেশের অবস্থা যেরূপ বর্ণনা করিয়াছেন এখন আর সে অবস্থা নাই। যে স্থানে পূর্ব্বে নৈমিষারণ্য ছিল, এখন সে স্থানে বনের ছিটে ফোঁটাও নাই। আমাদের চক্ষের উপরেই সুন্দরবন আবাদ হইয়া গেল। বন থাকিলে ভূমিতে রস থাকে, মেঘ আকৃষ্ট হয় ও অধিক বৃষ্টি হয়। বনের অভাবে এ সকলের ব্যতিক্রম ঘটিয়াছে। তাহার পর রেল-পথ-নির্ম্মাণে অনেক স্থানে জল-নির্গমনের ব্যতিক্রম ঘটিয়াছে। গঙ্গার মুখে প্রতি বৎসর রাশি রাশি পলি পড়িয়া ক্রমে ক্রমে নূতন দেশের সৃষ্টি হইতেছে। প্রবল স্রোতস্বতী নদী সকল এখন শুষ্ক হইয়া গিয়াছে। ফল কথা, নানা কারণে দেশের জল-বায়ু পরিবর্ত্তিত হইতেছে। যে সকল বস্তু দ্বারা আমরা পরিবেষ্টিত হইয়া আছি, সেই সমুদয় বস্তুর পরিবর্ত্তন হইলে আমাদের আচার-ব্যবহারও পরিবর্ত্তন করা আবশ্যক। কারণ, বাহ্য-

বস্তুর সহিত আমাদের শরীরের সম্বন্ধ অক্ষুণ্ণ রাখিতে পারিলেই আমরা জীবিত থাকি। বাহ্য-বস্তুর সহিত সম্বন্ধ-বিচ্ছেদ হইলেই আমরা মৃত্যু-মুখে পতিত হই। ত্বক্ যখন বাহ্য-বস্তু আর স্পর্শ করিতে পারে না, চক্ষু যখন দর্শন করে না, কর্ণ যখন শ্রবণ করে না, মন যখন চিন্তা করে না, তখনই আমরা বলি যে মৃত্যু হইয়াছে। বাহ্য-বস্তুর সহিত শরীরের সম্বন্ধ যখন জীবন, তখন বাহ্য-বস্তুর অবস্থা পরিবর্ত্তিত হইলে শরীরের অবস্থাও পরিবর্ত্তিত করিতে হয়। সেই জন্য শীতকালে আমরা শীতবস্ত্র পরিধান ও বর্ষাকালে ছাতি ব্যবহার করি। অবস্থা পরিবর্ত্তনের সঙ্গে সঙ্গে নূতন ব্যবহার প্রয়োজন হয়, সেই জন্য প্রাচীনকালে ক্রমে ক্রমে এতগুলি সংহিতার সৃষ্টি হইয়াছিল। কিন্তু এখন অবস্থা পরিবর্ত্তিত হইলে নূতন ব্যবস্থা করে কে? এখন আর আমরা কোন উপদেশ পাই না। পৃথিবীতে যখন নূতন তাঁতের সৃষ্টি হইল, তখন কেহ কি দেশের তন্তুবায়দিগকে রক্ষা করিয়াছিলেন? উপদেশচ্ছলে সেই অজ্ঞলোক-দিগকে কেহ একটী কথাও বলেন নাই। সে জন্য অতি নিদারুণ কষ্ট ভোগ করিয়া লক্ষ লক্ষ তন্তুবায় মৃত্যুমুখে পতিত হইয়াছিল। নূতন উপদেশের অভাবে এইরূপে নানা দিকে আমরা উৎসন্ন যাইতেছি।

দেশের লোককে নূতন নূতন বিষয়ে উপদেশ দিবার নিমিত্তই এই বিজ্ঞানালয় স্থাপিত হইয়াছে। দেশের জলবায়ু পরিবর্ত্তিত হইয়াছে; সে জন্যই হউক, কি যে জন্যই হউক, আমরা এখন নূতন নূতন রোগ দ্বারা আক্রান্ত হইতেছি। এক ম্যালেরিয়া জ্বরে দেশের লোককে উৎসন্ন দিতেছে। ম্যালেরিয়ার হাত হইতে নিষ্কৃতি পাইবার নিমিত্ত আমরা কি চেষ্টা করিতেছি? কিছুই নহে। কিন্তু আশ্চর্য্য দেখ! সাহে-বেরা এ সম্বন্ধে নিশ্চিন্ত নহেন। অনুবীক্ষণ যন্ত্র দ্বারা তাঁহারা পরীক্ষা করিয়া দেখিলেন যে, ম্যালেরিয়া জ্বরের বীজ স্বরূপ এক প্রকার জীবাণু আছে। ম্যালেরিয়া জ্বর দ্বারা আক্রান্ত মনুষ্য অথবা পশুদিগের রক্তে এই জীবাণু অধিক পরিমাণে থাকে। এক্ষণে কথা এই যে কোথা

হইতে এই জীবাণু আসিয়া মনুষ্য শরীরে প্রবেশ করে? অনেক অনুসন্ধান করিয়া সাহেবেরা দেখিলেন যে, মশক, মনুষ্য শরীরে বসিয়া শোণিত পান করিলে—সেই শোণিতের সহিত মশক-শরীরেও এই জীবাণু প্রবেশ করে। যাঁহারা পরীক্ষা করিতেছিলেন, সেই বিজ্ঞানবিৎ পণ্ডিতগণ, সেই মশক দ্বারা আপনাদের শরীর দংশন করাইলেন। মশক দংশনের দুই চারি দিন পরে তাঁহারা কম্প সহিত ম্যালেরিয়া জ্বর দ্বারা আক্রান্ত হইলেন। ইহাতে কি প্রমাণ হইল? ইহাতে প্রমাণ হইল যে, যে মশা কোন ম্যালেরিয়া-জ্বর কর্ত্তৃক-আক্রান্ত রোগীর রক্তপান করিয়াছে, সে মশা যদি সুস্থ মনুষ্যকে দংশন করে, তাহা হইলে সেই সুস্থলোকও ম্যালেরিয়া জ্বরাক্রান্ত হয়। আমাদের পল্লীগ্রামে ম্যালেরিয়া জ্বরাক্রান্ত রোগীর অভাব নাই, আর মশকেরও অভাব নাই। সুতরাং মশকের দ্বারা এক জনের শরীর হইতে অন্য জনের শরীরে যে এই বিষ নীত হইবে, সে আর বিচিত্র কথা কি! যাহা হউক, পণ্ডিতগণ অনুসন্ধান করিয়া ম্যালেরিয়া জ্বরের কারণ কতকটা এইরূপে বাহির করিলেন। সকল মশক ম্যালেরিয়ার কারণ নহে। মশার অনেক জাতি আছে। তাহাদের মধ্যে আনোফিলিসি নামক এক জাতীয় মশা দ্বারাই এক জনের শরীর হইতে অন্য জনের শরীরে ম্যালেরিয়া বিষ সঞ্চালিত হয়। এখন কথা এই যে, যদি এই জাতীয় মশা একেবারে নির্ম্মূল করিয়া ফেলিতে পারা যায়, অথবা মনুষ্যকে যাহাতে ইহারা দংশন করিতে না পারে সেই রূপ উপায় করিতে পারা যায়, তাহা হইলে ম্যালেরিয়া জ্বর কি নিবারিত হয়? ইতালী দেশে ও কিউবা দ্বীপে বিজ্ঞানবিৎ পণ্ডিতগণ বিশেষরূপে পরীক্ষা করিয়া দেখিয়াছেন যে, এই মশক যদি মানুষকে দংশন না করে, তাহা হইলে মানুষ ম্যালেরিয়া জ্বর দ্বারা আক্রান্ত হয় না। আফ্রিকার পশ্চিমকূলে সিরালিওন নামক ইংরেজ অধিকৃত স্থান আছে। এ স্থানে ম্যালেরিয়া জ্বরের এত প্রাদুর্ভাব ছিল যে, কোন শ্বেত মনুষ্য এ স্থানে অধিক দিন বাস করিতে পারিত না।

সে জন্য ইহার নাম হইয়াছে White Man's Grave অর্থাৎ "শ্বেত মানুষের কবর স্থান"। কিন্তু এখন সাহেবেরা কেরোসিন তৈলের সহায়তায় আনোফিলিস মশক অনেক মারিয়া ফেলিয়াছেন। সেই অবধি এ স্থানে ম্যালেরিয়া-জ্বর অনেক কমিয়া গিয়াছে। পূর্ব্বে যে হাসপাতালে এক শত জন ম্যালেরিয়া রোগী থাকিত, এখন সে স্থানে পাঁচ জন, কি ছয় জনের অধিক নাই। আমাদের দেশে নাগপুরের জেলখানায় ম্যালেরিয়া মশক সম্বন্ধে সাহেবেরা অনেক পরীক্ষা করিয়াছেন। ত্রিশ জন লোককে রাত্রিযাপন করিবার নিমিত্ত তাঁহারা মশারি দিয়াছিলেন। বাকি লোক বিনা মশারি রাত্রি যাপন করিত। যে ত্রিশ জন মশারির ভিতর নিদ্রা যাইত, তাহারা ম্যালেরিয়া জ্বর দ্বারা আক্রান্ত হয় নাই ; কিন্তু যাহারা আদুড় গায়ে শয়ন করিয়াছিল তাহারা প্রায় সকলেই জ্বর দ্বারা আক্রান্ত হইয়াছিল।

মশক, ম্যালেরিয়ার প্রকৃত কারণ হউক আর না হউক ; কিন্তু উপরের বৃত্তান্ত পাঠ করিলে আমরা বুঝিতে পারি যে, মানুষ এখন কত দিকে কত রূপ অনুসন্ধান ও পরীক্ষা করিতেছে। এইরূপ অনুসন্ধান ও পরীক্ষার গুণে অন্যান্য দেশের লোক নানা বিষয়ে জ্ঞান-সঞ্চয় করিতেছে, আর সেই জ্ঞানের সহায়তায় তাহারা অসীম বিক্রমশালী ও অপরিমিত ধনশালী হইতেছে। কিন্তু এই সমুদয় নূতন জ্ঞানে আমরা সম্পূর্ণ বঞ্চিত হইয়া আছি। যাঁহারা আমার এই প্রবন্ধ পাঠ করিবেন, এক্ষণে তাঁহাদিগকে আমি এই কথা জিজ্ঞাসা করি, যাহাতে আমাদের দেশের লোক এই সমুদয় নূতন জ্ঞান লাভ করিতে পারে সে বিষয়ে চেষ্টা করা উচিত কি না ? আমার মত এই যে, যদি আমরা এই সমুদয় নূতন জ্ঞানলাভ না করিতে পারি, তাহা হইলে আমাদের বড় দুর্গতি হইবে। তাহা হইলে হয় আমরা ধ্বংস প্রাপ্ত হইব, আর না হয় পশুতুল্য হইয়া আমাদিগকে জীবনযাপন করিতে হইবে। পশু পক্ষীরাও আপন আপন পরিবার প্রতিপালন করে। কিন্তু মানুষ স্বদেশের ও স্বদেশবাসীর

হিত চিন্তা করে। কেবল স্বদেশবাসীর কেন? মহাত্মাগণ সমস্ত মানব জাতির হিত চিন্তা করিয়া থাকেন। যাঁহারা আমার এই প্রবন্ধ পাঠ করিবেন, তাঁহারা সকলেই স্বদেশের মঙ্গল চিন্তা করেন, ইহাই আমার একান্ত প্রার্থনা। এরূপ চিন্তা করিলে তাঁহাদের সন্তান-সন্ততিরও উপকার হইবে। অমৃতবাজার পত্রিকা বার বার লিখিতেছেন যে, আমাদের দেশের ভদ্র ও শিক্ষিত জাতিরা ক্রমেই লোপ পাইতেছে। এই কলিকাতার নিকট গ্রামগুলির শোচনীয় অবস্থা দেখিলে হৃদয় বিদীর্ণ হইয়া যায়। কলিকাতার নিকট অনেক গ্রাম জনশূন্য হইয়া নিবিড় বনে পরিপূর্ণ হইয়া যাইতেছে। যাহাতে আমাদের মঙ্গল হয়, সে সম্বন্ধে কি একটু চিন্তাও আমরা করিব না? যাঁহার যেরূপ ক্ষমতা, তিনি সেইরূপ কি একটু যত্নও করিবেন না?

দেশের হিত-কামনা করিতে হইলে আমাদের প্রথম চিন্তা হইবে,— আধুনিক জ্ঞানসঞ্চয়। এই আধুনিক জ্ঞানসঞ্চয়ের নিমিত্ত সরকার মহাশয় সূত্রপাত করিয়াছেন। সরকার মহাশয়ের বিজ্ঞানালয়ে যাহাতে সুচারুরূপে কাজ হয়, এক্ষণে সেই বিষয়ে আমাদিগকে যত্নবান হইতে হইবে। বিজ্ঞানালয়ের প্রথম কাজ অনুসন্ধান ও পরীক্ষা। নানা বিষয়ে ক্রমাগত অনুসন্ধান ও পরীক্ষা করিতে হইবে। সেই পরীক্ষার জন্য লোক আবশ্যক। ভূতত্ত্ব, রসায়ন, তাড়িত প্রভৃতি এক একটী বিষয় লইয়া এক একটী লোক ব্রতী থাকিবেন। এক একটী বিষয়ে অনুসন্ধান ও পরীক্ষা করিতে তিনি জীবন অতিবাহিত করিবেন,—তবে যদি কিছু ফল হয়। জর্ম্মানিতে যে কৃত্রিম নীল প্রস্তুত হইয়াছে, তাহা দশ বৎসরের পরীক্ষার পর তবে হইয়াছে। ক্রমাগত অনুসন্ধান ও পরীক্ষার নিমিত্ত পাঁচ জন দেশীয় লোক নিযুক্ত রাখিতে ও আবশ্যকীয় দ্রব্যাদি ক্রয় করিতে মাসে তিন হাজার টাকার কম হয় না। অন্ততঃ পাঁচ ছয় লক্ষ টাকা মূলধন হইলে, তাহার সুদ হইতে এ কাজ এক প্রকার চলিতে পারে। কিন্তু এ পাঁচ ছয় লক্ষ টাকা কোথা হইতে

আসিবে? সরকার মহাশয় সমস্ত জীবন পরিশ্রম করিয়া বিজ্ঞানালয়ের নিমিত্ত এক লক্ষ টাকার অধিক সংগ্রহ করিতে পারেন নাই; সুতরাং সকলেই মনে করিতে পারেন যে, বিজ্ঞানালয়ের নিমিত্ত পাঁচ ছয় লক্ষ টাকা কিছুতেই সংগ্রহ হইবে না। কিন্তু আমি হতাশ হইতে পারি না। আমাদের দেশের লোক নির্ব্বোধ নহেন। আমি বার বার বলিয়াছি যে, বাঙ্গালির বুদ্ধি যেরূপ প্রখর, এরূপ প্রখর বুদ্ধি আমি কুত্রাপি দেখি নাই। শিক্ষিত বাঙ্গালিগণের যদি একবার ভালরূপে হৃদয়ঙ্গম হয় যে এই কাজ করিলে আমাদের দেশের মঙ্গল হইবে, আর স্বদেশের মঙ্গলে তাঁহাদের নিজেরও মঙ্গল হইবে, তাহা হইলে আমার নিশ্চয় বিশ্বাস এই যে, তাঁহারা কায়মনোবাক্যে সেই কার্য্যে ব্রতী হইবেন। কি কাজ করিলে আমাদের মঙ্গল হইবে, সেই বিষয়ের আলোচনা আজ আমি কুড়ি বৎসর ধরিয়া করিতেছি। সে আলোচনা বিফল হয় নাই। নানা বিষয়ে অনেক লোকের চক্ষু এক্ষণে উন্মুক্ত হইয়াছে; আর "সকলে আমরা দেশের হিত-সাধনে ব্রতী হইব" এই বলিয়া লোকের মনে একটা প্রতিজ্ঞার আভাস উদয় হইয়াছে। যাঁহাদের মনে এইরূপ চিন্তা উদয় হইয়াছে, পরিশ্রম করিয়া তাঁহারা যদি বিজ্ঞানালয়ের নিমিত্ত মূলধন সঞ্চয় করেন তাহা হইলে দেশের বিশেষ উপকার হইবে। আমি নিশ্চয় বলিতেছি যে, ভারতবাসীরা যদি আধুনিক বিজ্ঞান শিক্ষা না করে, আর সেই বিজ্ঞান যদি কৃষিকার্য্য, কারুকার্য্য প্রভৃতি নানাবিষয়ে প্রয়োগ না করে, তাহা হইলে তাহাদের দুর্গতির পরিসীমা থাকিবে না। তাহা হইলে দেশ হইতে মধ্যশ্রেণীর ভদ্রলোক একবারে লোপ হইবে। তাহা হইলে আমাদের সন্তান-সন্ততিগণকে পশুতুল্য হইয়া কুলিবৃত্তি করিয়া জীবন যাপন করিতে হইবে।

শেষ প্রস্তাব।

স্বদেশের হিতকামনা।

যে কাজ করিলে ভারতের মঙ্গল হয়, সেই কাজে সকলেরই যথাসাধ্য সহায়তা করা কর্ত্তব্য। এই ভারত আমাদের পিতৃ ও মাতৃ-ভূমি। যেমন মাতার স্তন্যপান করিয়া শিশুগণ প্রতিপালিত হয়, সেইরূপ ভারতজাত দ্রব্যে আমরা প্রতিপালিত হইতেছি। আমাদের শরীরের অস্থি, মাংস, রক্ত ভারতের ভূমি হইতে সংগৃহীত হইয়াছে। ভারত আমাদের পূর্ব্ব-পুরুষগণের কীর্ত্তিস্থল। এই স্থানে ভরদ্বাজ, ভৃগু, কশ্যপ প্রভৃতি পূর্ব্বপুরুষগণ মানবকুলকে শিক্ষা প্রদান করিয়াছিলেন। এই স্থানে মনু, মানবদিগের হিতের নিমিত্ত যে সমুদয় বিধি প্রবর্ত্তিত করিয়াছিলেন, এখনও সেই সমুদয় বিধি আমরা যথাসাধ্য মান্য করিয়া থাকি। এই ভারতের প্রজাপুঞ্জকে হরিশ্চন্দ্র, রামচন্দ্র, যুধিষ্ঠির, বিক্রমাদিত্য প্রভৃতি রাজগণ পুত্রবৎ পালন করিয়াছিলেন। আমাদের পূর্ব্বপুরুষগণ এই ভারতে বাস করিয়াছিলেন, আমরাও ভারতে বাস করিতেছি, আমাদের বংশধরগণ এই ভারতে বাস করিবে। এই ভারতভূমি পিতৃগণের প্রিয় স্থান, আমাদের প্রিয় স্থান, আমাদের পরে যাহারা আসিবে তাহাদেরও ইহা প্রিয় ভূমি হইবে। ভারতের অন্নে প্রতিপালিত হইয়া, ভারতের হিতের নিমিত্ত আমরা কি করিতেছি? পশুদিগের ন্যায় কেবল আমরা নিজের ও নিজের পরিবারবর্গের উদরপূরণে ব্যস্ত আছি! "ভারতের হিত"—ইহার অর্থ কি? ইহার অর্থ—

আমাদের নিজের ও আমাদের সন্তান-সন্ততির হিত ব্যতীত আর কিছুই নহে। দেবতাগণ স্বর্গ হইতে, পিতৃগণ পিতৃলোক হইতে, আমাদের কার্য্যকলাপ দর্শন করিতেছেন। তাঁহাদিগকে স্মরণ করিয়া আমাদিগকে মস্তক অবনত না করিতে হয়, তাহাই আমার প্রার্থনা।

ভারতের মঙ্গলসাধন এক জনের কাজ নহে, অনেক লোকের কাজ। প্রাচীন কথা আছে যে, "দশে মিলে করি কাজ, হারি জিতি নাহি লাজ।" কিন্তু এই প্রাচীন উপদেশ আমরা ভুলিয়া গিয়াছি। দশ জনে মিলিয়া আমরা যে কোন কাজ করিতে পারি না—ইহা সামান্য দুর্ভাগ্যের বিষয় নহে। পৃথিবীর অন্যান্য স্থানে দশ জনে মিলিয়া বড় বড় সাম্রাজ্য শাসন করিতেছে; কিন্তু আমরা দশজনে মিলিয়া সামান্য একটী সভার কার্য্য, কি সামান্য একটী যৌথ কারবার নির্ব্বাহ করিতে পারি না। সাত সমুদ্র পার, ছয় মাসের পথ হইতে জন কত বণিকের ভৃত্য আসিয়া, এই বিশাল ভারত-সাম্রাজ্য সংস্থাপিত করিয়াছেন। কিন্তু দুই ক্রোশ দূরে ভৃত্য-হস্তে সামান্য একটী দোকান সমর্পণ করিয়া আমরা নিশ্চিন্ত থাকিতে পারি না। দশ জনে মিলিয়া কাজ করিতে হইলে, সকল সময়ে, সকল বিষয়ে সকলের এক মত হইতে পারে না। এরূপ স্থলে অন্যান্য দেশের লোক সঙ্গিগণকে প্রথম আপনার মতে আনয়ন করিতে চেষ্টা করেন। সে বিষয়ে কৃতকার্য্য হইতে না পারিলে, তাঁহারা মস্তক অবনত করিয়া অধিকাংশের মত গ্রহণ করেন। অধিকাংশের মত নিজের মত বলিয়া সকলে মান্য করেন, আর যাহাতে সেই মতানুযায়ী কার্য্য হয়, সে বিষয়ে সকলেই তখন যত্ন করেন। কিন্তু আমরা তাহা করি না। কোন বিষয় আমাদের মনোমত না হইলে, অধিকাংশের মতের বিরোধী হইয়া যাহাতে তাহা কার্য্যে পরিণত হইতে না পারে—সে বিষয়ে আমরা যথাসাধ্য চেষ্টা করি। সেই অধিকাংশ লোকের সহিত আমরা

শত্রুতা করি, দলাদলি করি, মার পিট করি ও আদালতে মোকদ্দমা উপস্থিত করি। যদি সভা লইয়া এরূপ বিবাদ উপস্থিত হয়, তাহা হইলে অবশেষে যাত্রাদলের ন্যায় ভাঙ্গা সভা স্থাপিত করি। বলা বাহুল্য যে, যে জাতির এরূপ প্রবৃত্তি—সে জাতির লোক দশজনে মিলিয়া কোন কাজ করিতে পারে না। সেজন্য সাধারণের হিতের নিমিত্ত যে কোন কাজে আমরা প্রবৃত্ত হই না কেন, তাহার প্রথমেই আমাদিগকে এইরূপ সত্যে আবদ্ধ হইতে হইবে যে, অধিকাংশের যেরূপ মত হইবে, সেই মত আমরা শিরোধার্য্য করিব। নিঃস্বার্থভাবে কোন কার্য্যে প্রবৃত্ত হইলে, আপনা হইতেই মনে মনে এইরূপ প্রতিজ্ঞা আসিয়া যায়। কিন্তু নিজের লাভের জন্য অথবা নামের জন্য অথবা অন্য কোনরূপ স্বার্থের জন্য, যদি আমরা অপবিত্র মনে কোন কার্য্যে মনোনিবেশ করি, তাহা হইলে এরূপ প্রতিজ্ঞা মনে কখন উদয় হয় না। অধিকাংশ লোক কোনরূপ অন্যায় করিলে, তাঁহাদিগকে কুপথ হইতে সুপথে আনিবার নিমিত্ত ধৈর্য্যাবলম্বন করিয়া অপেক্ষা করিতে হয়। সত্যের জয় হইতে কিছু বিলম্ব হইলেও, অবশেষে সত্যের জয় নিশ্চয় হইয়া থাকে।

দশজনে মিলিয়া কাজ করিতে পারিলে, নানা বিষয়ে আমরা ভারতের উপকার করিতে পারি। যে সমুদয় বিদ্যার সহায়তায় অন্যান্য জাতি প্রভৃত ধনশালী ও পরাক্রমশালী হইয়াছে—সেই সমুদয় জ্ঞান দ্বারা ভারতবাসীকে আমরা ভূষিত করিতে পারি—নানারূপ রোগ হইতে ভারতের লোককে মুক্ত করিতে পারি। যে ভূমিতে এখন এক মণ দ্রব্য উৎপন্ন হয়, সেই ভূমিতে দুই মণ দ্রব্য উৎপাদন করিতে পারি। যে সমুদয় বনজাত দ্রব্য এখন বনে পচিয়া নষ্ট হইতেছে, সেই সমুদয় দ্রব্য বিদেশে প্রেরণ করিয়া—তাহাদের বিনিময়ে স্বর্ণ ও রৌপ্য উপার্জ্জন করিতে পারি। যে সমুদয় কারুকার্য্যের বিনিময়ে এখন লক্ষ লক্ষ মণ চাউল, গম প্রভৃতি কৃষিজাত দ্রব্য বিদেশীয়দিগকে প্রদান

করি, সে সমুদয় কারুকার্য্য দেশে করিয়া—সেই লক্ষ লক্ষ মণ চাউল প্রভৃতি দেশে রাখিতে পারি ও তাহা দ্বারা লক্ষ লক্ষ বুভুক্ষু ভারতবাসিকে ক্ষুধার জ্বালা হইতে পরিত্রাণ করিতে পারি। অন্যান্য দেশের লোক যে সমুদয় শিল্প দ্রব্য আদরে ক্রয় করে, সে সমুদয় দ্রব্য প্রস্তুত করিয়া বিদেশীয় অর্থ আমরা ভারতে আনিতে পারি। ভারতের বণিক্‌কুল ধ্বংস হইয়া গিয়াছে। বিদেশীয় আমদানি রপ্তানি এখন বিদেশীয়দিগের হাতে। প্রতি বৎসর একশত কোটি টাকার দ্রব্য আমদানি রপ্তানি হইতেছে। শক্তিহীন, জ্ঞানহীন পাগলের ন্যায় এই বিশাল বাণিজ্যের দিকে আমরা ফ্যাল্ ফ্যাল্ নয়নে চাহিয়া আছি। কিন্তু চেষ্টা করিলে আমরা সেই ধনপতি সওদাগর—সেই শ্রীমন্ত সওদাগরের মত লোককে ভারতে পুনর্ব্বার উৎপাদিত করিতে পারি। এ সকল কথার কথা নহে। আমি নিজে এইরূপ অনেক কার্য্যে কৃতকার্য্য হইয়াছি, সেইজন্য বলিতেছি। নানারূপ বিজ্ঞান বিষয়ে আমি সাধারণকে উপদেশ প্রদান করিয়াছি। নিজ মস্তকে ইষ্টকখণ্ড বহন করিয়া আমি গ্রামবাসীদিগকে কাদার দায় হইতে উদ্ধার করিয়াছি। নিজ হস্তে বন কাটিয়া আমি গ্রামবাসীদিগকে কিয়ৎ পরিমাণে জ্বরের যাতনা হইতে নিস্তার করিয়াছি। গো-খাদ্যের চাষ করিয়া গো জাতির ক্ষুধা নিবারণ করিয়াছি। যে দ্রব্যের মূল মানুষে ভক্ষণ করে, সেই দ্রব্যের চাষ করিয়া দুর্ভিক্ষপীড়িত লোকদিগের প্রাণরক্ষা করিয়াছি। যে স্থানে আলুর চাষ ছিল না, সে স্থানে আলুর চাষ প্রচলিত করিয়া পূর্ব্বাপেক্ষা অধিক পরিমাণে মানুষের খাদ্য উৎপাদন করিয়াছি। বনজাত হরীতকী প্রভৃতির ব্যবসায় উন্নতি করিয়া, বিদেশ হইতে নূতন অর্থ দেশে আনিয়াছি। ছাতা নির্ম্মাণ কার্য্যের সূচনা করিয়া ছাতারবিনিময়ে যে অর্থ বিদেশে প্রেরিত হইত, তাহার কিয়দংশ দেশে রাখিয়াছি। লোপপ্রায় তারকশি কার্য্যকে ধ্বংস হইতে রক্ষা করিয়াছি। মোরাদাবাদের

সিয়া-কলম প্রভৃতি কারুকার্য্য বিদেশীয়দিগকে বিক্রয় করিয়া, বিদেশের টাকা দেশে আনিয়াছি। নিজের গৌরব করিবার নিমিত্ত আমি এ সকল কথার উল্লেখ করি নাই। যে সমুদয় কার্য্যের কথা আমি পূর্ব্বে উল্লেখ করিয়াছি, তাহা যে আমাদের সাধ্যাতীত নহে—তাহাই বুঝাইবার নিমিত্ত আমি নিজের কথা উল্লেখ করিলাম। ঘোরতর হতাশ সমুদ্রে আমরা এখন হাবুডুবু খাইতেছি। এই দুঃসময়ে কোন একজন লোক সামান্য কোন কার্য্যে কৃতকার্য্য হইয়াছে—সে কথা শুনিলেও লোকের মনে আশার সঞ্চার হয়। লোককে উৎসাহিত করিবার নিমিত্তই আমি নিজের কথা উল্লেখ করিলাম। যদি দোষ হইয়া থাকে, তাহা হইলে আমাকে ক্ষমা করিবেন।

আমরা হতাশ সাগরে হাবুডুবু খাইতেছি। স্বদেশের উপকার করিতে ইচ্ছা থাকিলেও অনেকে জানেন না যে, কি উপায়ে তাহা করিতে পারা যায়। নিজের পরিবারের, প্রতিবাসিদিগের ও গ্রামবাসীর উপকার অনেকে করিয়া থাকেন; কিন্তু তাহার উপরে যাইতে বড় কেহ পারেন না। বৃহৎ বৃহৎ কাজ ব্যতীত অনেক সামান্য সামান্য কাজ আছে, যাহা অনায়াসেই সাধিত হইতে পারে। দৃষ্টান্ত স্বরূপ সামান্য একটী কাজের উল্লেখ করি। পশ্চিমে সকল নগরে ও প্রায় সকল বড় বড় গ্রামে পান্থশালা আছে। কিন্তু কলিকাতায় সেরূপ পান্থশালা নাই। পল্লিবাসিদিগকে কোন কর্ম্মোপলক্ষে কলিকাতায় আসিতে হইলে, বড়ই বিপদে পতিত হইতে হয়। এ দুঃখ অতি সহজেই দূর হইতে পারে। তাঁহার নাম ধন্য হউক, যিনি হাওড়া ষ্টেশনের নিকট এইরূপ এক পান্থশালা নির্ম্মাণ করিয়াছেন। যাহা হউক, এ বিষয়ের এখন আর আলোচনা করিব না।

আমার কামনা ইহা অপেক্ষা আরও অনেক অধিক। সমগ্র দেশের লোককে জ্ঞানে, ধনে ও সম্মানে ভূষিত করিতে পারি, তাহাই আমার কামনা। এ কাজের সূচনা করিতে হইলে, প্রথম আধুনিক জ্ঞানের

আবশ্যক। সেই জন্য সরকার মহাশয়ের বিজ্ঞানালয়ের কথা প্রথমেই আমি উত্থাপিত করিয়াছি। এই বিজ্ঞানালয়ে কেহ বা উদ্ভিদ্‌তত্ত্ব, কেহ বা প্রাণীতত্ত্ব, কেহ পদার্থতত্ত্ব, এইরূপ নানা বিষয়ের অনুসন্ধান ও পরীক্ষা লইয়া জীবন অতিবাহিত করেন, তাহাই এখন নিতান্ত প্রয়োজন। কিন্তু পূর্ব্বেই বলিয়াছি যে, একাজ আরম্ভ করিতে হইলে অন্ততঃ পাঁচ ছয় লক্ষ টাকা মূলধনের আবশ্যক। এখন সময় এইরূপ পড়িয়াছে যে, যে কাজেই প্রবৃত্ত হই না কেন, সেই কাজই লক্ষ লক্ষ টাকার মূলধন ব্যতীত সম্পাদিত হইতে পারে না। দেখিতে অধিক টাকা বটে; কিন্তু দশ জনে মিলিয়া নিঃস্বার্থভাবে পরিশ্রম করিলে, এ মূলধন অনায়াসেই একত্রিত হইতে পারে। এই বঙ্গদেশে প্রায় এক লক্ষ লোক আছে, যাহারা ভিক্ষা দ্বারা জীবন নির্ব্বাহ করে। অনেক হিন্দু বৈরাগী ও মুসলমান ফকির আছে, যাহারা পুরুষ পুরুষানুক্রমে এই কাজ ব্যতীত অন্য কাজ কখনও করে না। ভিক্ষা ব্যতীত অন্য কাজ করিলে তাহাদের অধর্ম্ম হয় ও জাতি যায়। যেমন তেমন করিয়া মাসে এক টাকার কম একজন লোক প্রাণধারণ করিতে পারে না। তবেই হইল যে, এই বঙ্গদেশের ভিখারিগণ মুষ্টিভিক্ষা দ্বারা হউক অথবা অন্য কোন প্রকার ভিক্ষা দ্বারা হউক প্রতি বৎসর বার লক্ষ টাকা লোকের নিকট আদায় করিয়া থাকে, বরং অধিক তবু কম নহে।

বৃদ্ধ, দীন-পিতা ভারতের নিমিত্ত ভিখারীর আবশ্যক। যুবক পুরুর নব শোণিতে যযাতি রাজার জীর্ণদেহ যেরূপ সজীব হইয়াছিল, সেইরূপ ভারতপুত্রদিগের শোণিতে বৃদ্ধ ভারতের দেহকে সজীব করিতে হইবে। বৃদ্ধ ভারতকে শোণিত প্রদান করিবার নিমিত্ত পিতৃভক্ত পুত্র কি এই বঙ্গদেশে আছেন? তাহাই আমি জানিতে ইচ্ছা করি। ভারতের হিতের নিমিত্ত ভিখারী হইয়া তাঁহাদিগকে ভিক্ষা করিতে হইবে, এইরূপ শোণিত আমি প্রার্থনা করি। এরূপ কাজে দ্বারে দ্বারে মুষ্টিভিক্ষা করিতে হয়, তাহাও স্বীকার; এরূপ প্রতিজ্ঞা তাঁহারা কি করিতে পারি-

বেন ? যদি বঙ্গদেশে এরূপ লোক থাকেন, তাহা হইলে তাঁহারা আপন আপন নাম ও ঠিকানা পোষ্টকার্ডে লিখিয়া "ডাক্তার শ্রীযুক্ত অমৃতলাল সরকার" মহাশয়ের নিকট প্রেরণ করিবেন। অমৃত বাবু "শ্রীযুক্ত মহেন্দ্র লাল সরকার' মহাশয়ের এক মাত্র পুত্র। ইনিও ডাক্তার। বিজ্ঞানালয়ের নিমিত্ত ইনিও নিঁজের প্রাণ সঁপিয়াছেন। তাহা ব্যতীত এই কলিকাতা নগরের গীতা-সমাজ ইঁহার দ্বারাই প্রতিষ্ঠিত হইয়াছে। ইহার নিকট নাম ও ঠিকানা পাঠাইলে, তাহার পর কি করিতে হইবে, সে কথা পরে বলিব। ভারতের হিতের নিমিত্ত যদি পঞ্চাশ হাজার ভিখারী একত্রিত হয়, তাহা হইলে প্রতি বৎসর পাঁচ লক্ষ টাকা অনায়াসেই তুলিতে পারা যায়। দ্বারে দ্বারে মুষ্টিভিক্ষা করিতে হয় না। অন্নপ্রাশন, যজ্ঞোপবীত, বিবাহ প্রভৃতি শুভকার্য্যের সময় লোকের নিকট কিছু কিছু প্রার্থনা করিলেই, বোধ হয় যথেষ্ট হয়। আমাদের অনেক গ্রাম, আমরা অনেক লোক। "দশের লড়ি, একের বোঝা"; এক এক জনের নিকট সামান্য কিছু আদায় করিতে পারিলেই টাকার বোঝা হইয়া পড়ে। এক এক জনের নিকট যৎসামান্য কিছু কিছু আদায় করিয়া প্রতি বৎসর যদি পাঁচ লক্ষ টাকা তুলিতে পারা যায়, তাহা হইলে দশবৎসরের ভিতর দেশের অবস্থা পরিবর্ত্তিত হইতে পারে। প্রথম বৎসরের টাকা ধর, বিজ্ঞানালয়ের কার্য্যে প্রদান করিলাম। দ্বিতীয় বৎসরের টাকায় নূতন একটী কল-কারখানা স্থাপিত করিলাম। এইরূপ পাঁচ বৎসরের টাকায় পাঁচ প্রকার কল-কারখানা স্থাপিত করিলাম। এই পাঁচটী কারখানা যেই লাভবান্ হইল, অমনি সাধারণকে তাহা বেচিয়া ফেলিলাম; আর সেই টাকায় পুনরায় নূতন পাঁচটী কারখানা স্থাপিত করিলাম। চিঁড়ের বাইশ ফের হইয়া কল-কারখানা এইরূপে বৃদ্ধি হইতে পারে। তাহার পর অন্যান্য বৎসরের টাকায় পান্থশালা, শিল্পবিদ্যালয় বিজ্ঞান-বিদ্যালয়, কৃষিবিদ্যালয় প্রভৃতি নানারূপ কার্য্যের অনুষ্ঠান হইতে পারে।

হয় সব,—যদি পরিশ্রম করিবার নিমিত্ত লোক পাওয়া যায়। উড়িষ্যা ও বেহার পরিত্যাগ করিয়া এই বঙ্গদেশে প্রায় চারি কোটি লোক ও আশী লক্ষ গৃহস্থের বাস। প্রতি গৃহস্থের নিকট যদি একটা করিয়া পয়সা আদায় করিতে পারা যায়, তাহা হইকে এক লক্ষ টাকা হইয়া পড়ে। তাই বলিতেছি যে, আমরা অনেক লোক, মনে করিলে আমরা সব করিতে পারি। ভারতের হিতের নিমিত্ত প্রতি গ্রামে যদি এক জন করিয়া ভিখারী হয়, তাহা হইলে আর ভাবনা কি? এইরূপ ভিখারী করিতে ক্রমাগত চেষ্টা করা আবশ্যক। প্রথম যদি এক হাজার লোক হয়, তাহা হইলে নিরাশ হইবার কোন কারণ নাই। সেই এক হাজার লোকের শিক্ষায়, উত্তেজনায় ও দৃষ্টান্তে দশ হাজার লোক হইবে। ভারতের হিতের নিমিত্ত একলক্ষ লোক যদি চারিদিকে নিঃস্বার্থ ভাবে পরিশ্রম করে, তাহা হইলে আর আমাদের ভাবনা কি? যাহা হউক আপাততঃ আর অধিক কিছু বলিতে ইচ্ছা করি না। ভারতের হিতের নিমিত্ত যিনি পরিশ্রম করিতে ইচ্ছা করিবেন, আপাততঃ তিনি "ডাক্তার শ্রীযুক্ত অমৃতলাল সরকার" মহাশয়ের নিকট আপনার নাম পাঠাইয়া দিবেন। অমৃতবাবুর ঠিকানা—"সাঁকারি-টোলা, কলিকাতা।" কাজ করিবার যদি লোক হয়, তাহা হইলে তাঁহাদের সহিত পরামর্শ করিয়া কার্য্যানুষ্ঠানের ব্যবস্থা করা যাইবে। যদি লোক না হয়, তাহা হইলে বুঝিব যে শিক্ষিত লোকদিগের জঠরের জ্বালা আরও একটু প্রখরতর না হইলে, তাঁহাদের চক্ষু ফুটিবে না ও দেশে বক্তৃতাস্রোত ঘুচিয়া কার্য্যস্রোত প্রবাহিত হইতে আরম্ভ হইবে না।

শ্রীত্রৈলোক্যনাথ মুখোপাধ্যায়।

Speeches of Dr. Sircar at Some of the Annual Meetings of the Association.

Speech at the 24th Annual Meeting, held Sept. 5, 1902.

AFTER the reading of the Report Dr. Sircar, at the call of His Honor the President, addressed the meeting as follows :—

YOUR HONOR, GENTLEMEN, AND YOUNG FRIENDS,—

This is the twenty-fourth annual meeting of our Association, which means that the Institution, since its inauguration in 1876 under the presidency of Sir Richard Temple, the then Lieutenant-Governor of Bengal, has been in working existence for exactly a quarter of a century. Judged by outward appearances the Institution has made considerable progress, more indeed than any indigenous institution can show. It has got a local habitation, a splendid lecture hall, and a good laboratory equipped with scientific instruments and apparatus and materials, physical, chemical and biological, now second only in some respects to that of the Presidency College which, as you know, enjoys the patronage and benefaction of Government. It has been delivering lectures on various subjects, chiefly on physics, chemistry, and biology, year after year, to the number of about a hundred a year,—lectures which are free to the members and to those whom they are pleased to recommend, and are available to the general publie including students for a nominal fee.

I must admit there is no cause for dissatisfaction with the condition of things that has advanced so far, if only we could be assured that that condition would

be permanent. But if we remember that our lectures are delivered by men who are unremunerated, with one exception in which case the remuneration is only nominal; and if we remember that our funds do not permit us to remunerate even one lecturer adequately enough to secure his full-time service, it will be obvious that we have not been able to secure permanency for lectureship on a single subject. This means that the Science Association, notwithstanding its outward imposing appearance of a fine building and a rich collection of up-to-date appliances for demonstration of scientific truths and investigation of scientific subjects, has not yet had the foundation laid for its continued existence even of a very humble character, that of diffusing scientific knowledge acquired elsewhere.

What are we to say then of the Association as an institution of original research, which is indeed the main object for which it was established? However much there may still be necessity for the Science Association as a mere educational institution, that necessity will cease, when our schools and colleges wake up to their responsibility of providing their pupils with suitable laboratories for elementary science-teaching, and then its only *raison d'être* will be the advancement of Science by original research. If it cannot be made to fulfil that object it would be better that it should cease to exist. I can scarcely tell you with what heart I utter these words. I have not lost faith in Science as the only force which, in the present state of things, can take our country forward to the points reached by other civilized countries. But unless this be the faith of all my countrymen, or at least of

our leaders, no amount of faith of a single individual will avail. Strangely enough, the experience of a whole life compels me to say that faith in the elevating and regenerating influence of Science, if it does exist in the mind of our community, has not grown yet to bear fruit. Aye! Gentlemen, pardon me, if I question if it is a living faith at all.

If it had been a living faith, it would not have been so barren as it has been; it would have been far more reproductive. From the announcement of the project of the Association in 1870 to its actual inauguration in 1876, we had 170 members. Since then up to the present year, that is, in twenty-five years, there has been an increase of only 67 members. Of this number we have lost by death no less than 115, and we do not get any response from over 20; we have thus now left less than 100 members. Now if each member had imparted his zeal for Science to at least one, the loss by death would have been more than compensated; if to two then the number of members would have been to-day over two hundred, after making allowance for deaths. What the number would have been if each member had converted to his faith three or more, I leave my honourable colleague Dr. Asutosh Mukerji to calculate. I need hardly remind you that with increase of members our funds would have proportionately increased, and then there would have been no difficulty in endowing professorships, that is, in securing the services of whole time workers who would have been engaged in research. The question naturally arises, if such was the easy way of helping the growth and development of the Association, what was

the obstacle in that way? Each member by his liberal donation has given proof of his faith in Science as a potent factor of civilization. Why has that faith failed to infuse a missonary spirit in the member? I have given my answer to this question, and it would be an immense relief to me to know that I am wrong.

Before you condemn me as being too hard and reproachful, remember what Britain has done for Science, how she has had the privilege of the making of those branches of it in the nineteenth century which have revolutionised the world, and yet listen how her own men of science are never tired of reproaching their countrymen for their niggardliness in the cause of Science, and for their unscientific spirit. Dr. George Bagot Ferguson, at the last annual meeting of the British Medical Association, recently held, thus delivered himself: "I can only hope that in the great advances still to be made Great Britain and Ireland may play their worthy part; but I confess I have my misgivings unless some improvements are made in our educational arrangements. As the result of several Augusts spent in many of the continental capitals, I have been struck with the thoroughness and scientific spirit everywhere there manifested; being very different, I regret to add, from the anti-scientific spirit which characterises most of the wealthier and more cultivated classes in this country. This anti-scientific spirit is only eradicable by the better education of the young. To what other cause can we ascribe the fact that although the aniline dyes were discovered in 1858 by an Englishman, Dr. W. H. Perkin, yet almost the whole of their manufacture is now carried on in

Germany. One company, the Badische Anilin und Soda Fabrik, employs 146 scientific chemists, 75 civil engineers, and 6,300 workmen in one alone of its three factories."

And yet in our country several industries, such as glass-making, match-making, &c., have been started without a single scientific man in any of them to guide and control their operations, and with what result? What but absolute failure? And yet in the face of these failures, educated patriotic gentlemen are wasting their energies in the vain endeavour to promote technical education without even thinking of the absolute necessity of a preliminary scientific education. And patriotic editors have not been wanting who have denounced in no measured terms your humble servant for not having given his consent to convert this institution into a technological institute; as if his consent without adequate funds was all that was necessary to start a full-fledged institute for the initiation of our young men in the mysteries of all the arts and industries! I need not repeat what I said at a previous annual meeting as to the requirements of a technical institution, and with what magnificent sums the various European countries have endowed their technical institutions, and I need not tell you how contribution after contribution is following for their further improvement in order to keep pace with the progress of discovery which they have themselves been instrumental in making.

If we want to make scientific education worth having we must be unmindful of the cost. The cost, whatever it may be, "would be as nothing in propor-

tion to the gain," very rightly said Dr. Ferguson whom I have already quoted, "and a Faraday, a Koch, or a Pasteur would be a cheap purchase at a million. Whereas France, Germany, and the United States educate at their universities approximately one student in every 1,500 of the population, we in the United Kingdom are content with less than 1 in 2,000. Whereas Germany spends £753,000 a year on its twenty-two universities and France £740,000 a year on its sixteen we in Great Britain and Ireland are content with less than one-fifth of that amount, namely, £135,339 among seven of our thirteen. Although the Laland Stanford University of California has received no less than nine millions sterling from private munificence, and many others of the 480 American universities and colleges have likewise received huge sums—I may specify the Chicago University £2,000,000, the Johns Hopkins University £1,400,000, and the Cornell University over £1,000,000—no such general largess is, I fear, to be expected from our British millionaires."

Will Indian millionaires permit this reproach to be applied to them? Has not Mr. Tata, of Bombay, shown what an enlightened Indian millionaire can do? Is there only one Tata in all India? I believe not. That I am not wrong will be evident from the recent most gratifying fact of the display of devotion and gratitude to the sacred memory of our late beloved Queen-Empress. The stream of subscription that has flowed in aid of an All-India Memorial for Her late Majesty must show that if our millionaires can be made to comprehend the worthiness of an object they are ever ready to further it with open-handed liberality. Oh!

that they would understand, as did their forefathers, that there cannot be a worthier object of charitable endowment than learning, and what learning in the present day is more worthy to be pursued than the learning which the universe presents to us as expressing the mind of the Creator Himself? Hōw I wish that I had an infinitesimal fraction of the persuasive eloquence of a Lord Curzon to enable me to impress upon my countrymen the absolute necessity and the imperative duty of furthering the cause of such learning.

Our sages of yore had, it is acknowledged, a deep insight into spiritual things. If you carefully analyse their arguments you will find them almost invariably based upon phenomena presented by the material world, and these are phenomena which are obvious to all, that is, which are but superficial, the underlying principles of which could only be revealed by elaborate methods of observation and experiment. In other words, their most recondite conclusions were inferences from or interpretations of these superficial phenomena. And necessarily they had in many instances to go astray and waste their energies in problems which are unsolvable, and attempted to formulate and maintain propositions which became stereotyped into dogmas, a blind faith in which has proved disastrous, indeed, has actually been the cause of the arrest of all progress in India, which, from having been the earliest instructress of the world, has degenerated into the condition which we all deplore, and for the amelioration of which it should be the duty of every one who takes pride in the name Indian to do his best.

That amelioration, in my humble belief, can only be effected, not by reversing the intellectual processes that have been obtaining for ages past, but by furnishing them with a basis, the truth and substantiality of which is verifiable, and is being verified at every step, the basis, in a word, of observation and experiment. "The science of our century," said Sir William Crookes in his presidential address at the British Association for the Advancement of Science, "has forged weapons of observation and analysis by which the veriest tyro may profit. Science has trained and fashioned the average mind into habits of exactitude and disciplined perception, and in so doing has fortified itself for tasks higher, wider, and incomparably more wonderful than even the wisest among our ancestors imagined. Like the souls in Plato's myth that follow the chariot of Zeus, it has ascended to a point of vision far above the earth. It is, henceforth, open to science to transcend all we now think we know of matter, and to gain new glimpses of a profounder scheme of Cosmic Law."

If the problem of education throughout the civilized world is one of vital importance, it is pre-eminently so in India. And it is a matter of happy augury that it is engaging the serious attention of the authorities, and especially of the nobleman at the helm of our affairs. But whatever might be the details which will have to be worked out, there can be no doubt that no scheme of education will be deserving the name which will not assign to science a prominent place in the curriculum. But science should not only be taught in schools and colleges and universities, it should be

cultivated in order to be advanced, outside the walls of those institutions. The very progress which science has enabled the world to achieve has revolutionized the relations between man and man, nation and nation, race and race. The struggle for existence is becoming harder and harder, and competition is necessarily becoming keener. So that there is danger of losing not only prestige but the very chances of existence, unless pace is kept with progress already made. But science has not only to save individuals and nations, it will have to save humanity itself. You doubtless remember how Sir William Crookes startled his audience by proving almost to demonstration that the wheat-producing capacity of the world is getting exhausted comparatively to the ratio of increase of its population, and pointed "a way out of this colossal dilemma." "It is the chemist," said he, "who must come to the rescue of the threatened communities. It is through the laboratory that starvation may ultimately be turned into plenty."

This is very nearly the thing I said at our twenty-first annual meeting in 1898, a few months before Sir William uttered those words, that is, before they could be wafted to our shores. With reference to the averting and combating of famines I said that we ought, in the first place, to predict in order to provide for them, by cultivating meteorology on more extended lines than has hitherto been done; and in the second place, we ought to counteract them when they actually occur, and, "this can only be effected by a system of agriculture which will render us largely independent of unfavourable meteorological conditions; and by the

discovery of the food resources of the country, other than those already available. These objects can only be attained by the further development of Botany and Chemistry than has already yet been done." You see then, Gentlemen, the importance of Science under a novel, unexpected, and literally most vital aspect. You see how the cultivation and advancement of Science are intimately bound up with the future existence of the human race, how its neglect will lead to our final extinction, at least as civilized men. This is no visionary dream, but a calculated terrible reality however remote may be its occurrence. We should be neglecting our duty to posterity if we neglect this warning simply because it does not concern us immediately.

You see what powerful incentives we have for the cultivation of science, in other words, for the accumulation and systematisation of knowledge based upon the observed phenomena of the Universe, or, as Huxley preferred to call it, the organization of common sense, —the last-mentioned incentive being the most interesting at the same time that it is the most potent from the point of view of the highest philanthropy. The question for you to determine is, whether you will allow *your* country to take part in the grand struggle for existence unfolded by latter-day science undreamt of by Darwin himself. I do not for a moment hesitate to believe that your answer will be an emphatic affirmative. That being so, you can only do it by organizing and multiplying institutions like this throughout the country. I hailed with delight the appearance of Mr. Tata's scheme as a duplicate of our own, but would it not be deplorable if ours, the original scheme, were to

fail from want of the necessary support. May I not hope, Gentlemen, that you will not willingly starve your own infant? If so, you should at once make serious attempts to endow professorships which, with well-equipped laboratories, form the only substantial nourishment of scientific institutions.

The professorships started in the names of two men, Lord Ripon and David Hare, for whom we Bengalis are never tried of showing our regard and love, have been long awaiting subscriptions for permanent endowment, but unfortunately, notwithstanding earnest appeals from Viceroys and Lieutenant-Governors, the subscription lists are standing at the low level at which they began. In the face of these facts it may be thought sheer madness to propose another professorship. But Gentlemen, I cannot help making a proposal for a fresh professorship, confident that the name, which I wish you to attach to it, will take away any stigma that may be cast upon me for my audacity. I propose, Gentlemen, that you should endow at least one Professorship in the name of Queen-Empress Victoria, and then I am sure other professorships will naturally gravitate round it as round a mighty central attracting force. The Victorian Era was pre-eminently an era of science, and next to the All-India Memorial, which I hope will be realized in the magnificent form sketched out by Lord Curzon, we cannot have better memorials than such professorships in an institution, the first of its kind in India, and established in the metropolis of India, to perpetuate her sacred memory.

If in this connection I remind you that the Association itself was founded as a memorial in honor of the

visit to India of His Royal Highness, Prince Albert, now His Most Gracious Majesty, King Edward VII., our beloved Emperor, I dare say you will not hesitate to found the Professorship I have proposed. In doing this you will be doing honor not only to our late saintly Queen but also to her most worthy son and successor, our King-Emperor. Remember what Dr. T. K. Pearsons, of Chicago, in making a donation of £800,000, or very nearly a crore and half of our money, to the Universily of his city, said: "Monuments and monumental arches once finished become dead memorials; their active function ceases. The school and the college live just as does the memorial in cold statuesque granite, but *their* functions never cease; education goes on from day to day, thinkers are moulded, the nation is served, humanity is benefited in the college."

These are days of princely benefactions to seats of learning, of which, besides those incidentally mentioned, we have had the latest and noblest example in Mr. Carnegie's gift of ten million dollars, or over three crores of rupees, to the universities of Scotland. Though a naturalized citizen of the United States where he made his fortune, Mr. Carnegie did not forget the land of his birth. May I not hope that the happy contagion will spread in our country, and bring under its blessed influence her patriotic sons, who will thus be enabled by the proper use of their wealth to wipe off for ever the stigma that has been cast by the poet upon her as being a land of "barbaric pearl and gold."

From millionaires I must now come down to the

humble but much abused class to which I feel pride in belonging. I will entreat men of this class to remember that they form the real backbone of Society, that it is their small units which make up the millions of the millionaire, and that if they will but understand their own interests they can make any undertaking successful which tends to the welfare of the world, which means of themselves.

And just a word to students before I sit down. It is for you, my young friends, that I have devoted, I hope you will not permit me to say, wasted a whole life. It was because as student, which I am still, I felt the difficulties in the way of the cultivation of science so necessary for our regeneration, that I conceived the project of this Association, and have been begging ever since for its due endowment. At the end of over thirty years you find me where I am, occupying a position which does not satisfy me and is far from consolatory when I am about to lose sight of you for ever. I had hopes that even during my lifetime I shall have the gratification of seeing this Association flourish as has done the Royal Institution from its birth, on the model of which it was founded, that if not myself, burdened as I am with heavy professional and other duties and living a life which is "one long disease," some of you would be able to make some additions to the stock of knowledge, and thus take part in the grand intellectual movement which is going on throughout Europe and America, and which has lately spread to an Asiatic country in the far East, a country which was immeasurably our inferior in all that is intellectual and moral.

Those hopes, my dear friends, have been disappointed. And for this, pardon me, if I tell you, you are partly to blame. It is true that I have not been able to provide adequate remuneration for workers. But is it not a matter of wonderment that in India where for ages learning has been pursued for learning's sake, where *Niskama Karma*, work without any expectation of reward, has been preached as the highest duty and the very essence of religion, not a single student, either during college life or after, has come forward, ever since the foundation of the Association, to cultivate science for the sake of science? I must not stop here to inquire into the causes of this undreamt-of change in the Indian mind. I content myself with simply stating the fact.

Allow me to impress upon you the solemn responsibility of your position as in very truth the only hope of your country. No scheme of education, however elaborately and scientifically devised, will avail unless *you* shake off your apathy and indifference and—I will not shrink from adding—conceit. If you fail or neglect to do this, you should be neglecting a four-fold duty;—duty to yourselves as rational human beings; duty to your country from which you have received a rich heritage of a glorious past; duty to the Government under which you enjoy blessings you never did under your own, not the least of which, in my humble opinion, is the quiet but sure effacement and dissolution of all unholy distinctions between man and man, which I regret to say a recent action of a Government official is tending to revive and re-crystallise; and lastly your duty to the Almighty Father who has endowed

you with faculties not inferior in acuteness, delicacy, and capabilities to those of any nation or race on earth. All these duties, let me tell you with all the earnestness in my power, imperatively demand that you should employ those faculties in the noblest work in which the mind of man can be engaged, namely, the discovery of truth as it is in Nature, which means holding communion with your Maker through his works, works, the more you know of them the more you will find them, declaring in clear unmistakable language, His power, His glory, and His righteousness.

Gentlemen, we are holding this meeting on a day which, though apparently it has proved somewhat unlucky for us, is looked upon by you, my Hindu countrymen, as the most auspicious day of the year, being the birthday of Sri Krishna who, according to our Sastras, came into the world to destroy evil and to restore true religion. May I hope that this meeting held to-day under the presidency of one of the wisest and most kind-hearted of our rulers, will prove auspicious in enabling the Association to fulfil the function for which it was established,—the function, namely, of removing ignorance the root of all evil, and of advancing science or true knowledge which, in the fulness of time, will be found to be synonymous with true religion?

Need I remind you of what the Bhagavad-Gita has so truly said in praise of the supreme worth of Knowledge in exquisite song?

यथैधांसि समिद्धोऽग्निर्भस्मसात् कुरुतेऽर्जुन ।
ज्ञानाग्निः सर्व्वकर्म्माणि भस्मसात् कुरुते तथा ।३७।

न हि ज्ञानेन सदृशं पवित्रमिह विद्यते ।
तत्स्वयं योगसंसिद्धः कालेनात्मनि विन्दति । ३८ ।

श्रद्धावाँल्लभते ज्ञानं तत्परः संयतेन्द्रियः ।
ज्ञानं लब्ध्वा परां शान्तिमचिरेणाधिगच्छति । ३९ ॥

भगवद्गीता ॥ ४र्थः ॥

As the kindled flame
Feeds on the fuel till it sinks to ash,
So unto ash, Arjuna! unto nought
The flame of Knowledge wastes works' dross away!
There is no purifier like thereto
In all this world, and he who seeketh it
Shall find it—being grown perfect—in himself.
Believing, he receives it when the soul
Masters itself, and cleaves to Truth, and comes—
Possessing knowledge—to the higher peace,
The uttermost repose.

SIR EDWIN ARNOLD'S *Translation.*

37. As the kindled fire reduces all fuel to ashes, Arjuna! So the fire of knowledge reduces all works to ashes.

38. For no purifier is found on earth equal to knowledge. One who is perfect in devotion finds it in course of time in himself.

39. This knowledge is obtained by the believer, who is devoted to it and has subdued the senses; when he has obtained it, he reaches without delay the supreme repose *(nirvána).*

JOHN DAVIES'S *Translation.*

Speech at the 23rd Annual Meeting, held Aug. 30, 1900.

After the reading of the Report Dr. Sircar addressed the meeting as follows :—

MR. CHAIRMAN, MAHARAJAH BAHADUR, RAJAHS AND GENTLEMEN,—

Besides electing your Office-Bearers and Committee of Management for the ensuing year, you have to-day to consider two recommendations of the Committee of Management whose term of office is about to expire.

One of these recommendations is to give effect to the scheme of opening a class for commercial analysis, submitted by our lecturer on Chemistry, Rai Chuni Lal Bose, Bahadur. The scheme has everything to recommend it for your approval, and indeed we cannot be too thankful to the Rai Bahadur for its formulation, and for promising to carry it out himself, if you will only accord your sanction.

The opening of a practical class for commercial chemical analysis under such an expert as Rai Chuni Lal Bose, Bahadur, will mark an epoch not only in the history of the Association, but I may confidently say, in the history, of the country as well. It is, as Dr. Chuni Lal has very justly said, "calculated to open a new field of enterprise and energy for our young men, and, if they care to utilize it for the development of the resources of the country, may be expected to produce good results in the near future. It will help many of our young men to secure an honest living and may serve as a step to honor and distinction. Some may set up business on their own account and with

steady and assiduous application, achieve success in their particular lines."

The complaint has often been made against the Association that it has done nothing practical. If those, who make the complaint, took pains to acquaint themselves with the requirements of technical instruction and with the difficulties which the Association labors under from want of funds, they would have been more sympathetic, and would have striven to help the institution in removing those difficulties. But instead of seconding its efforts to obtain funds, they have been iterating and re-iterating their complaint and thus making unreflective people believe that for some inexplicable perversity of its managing body it is not doing what it can easily do for the benefit of the country.

If your Committee of Management are now asking you to sanction the opening of a practical class of chemical analysis, it is not because we have funds enough to remunerate the expert who is to be in charge of the class, but it is because we have got in our lecturer on chemistry an expert who has volunteered to take on his shoulders the arduous duties of conducting such a class without remuneration, out of a pure love of his country. The additional outlay for the purchase of the necessary books and chemical appliances can be met from our income and will not touch our invested funds. There need, therefore, be no hesitation on your part to accord the sanction wanted.

The second recommendation which you have to consider is the recommendation for the affiliation of the

Association to the Calcutta University for the B. course of the B.A. degree and for the B.Sc. degree. Under your sanction the Association has been affiliated in Physics and Chemistry up to the First Arts standard since 1893. This was done to meet the requirements of students of private institutions which at that time had not the necessary equipment for teaching physics and chemistry up to that standard. Since then most of these institutions have provided themselves with the necessary apparatus and teachers to qualify their students even up to the B. course of the B.A. degree. But the B.Sc. degree newly sanctioned will require of candidates a practical examination, to successfully pass which the candidates will have to undergo a special training for which some of our educational institutions are not yet in a position to provide. This Association has especial advantages for making ample provision for such training. It has therefore been thought advisable that we should undertake to enable students of those institutions, and also private students, to properly qualify themselves for that degree.

When the question of affiliation was first raised in 1893, some true and zealous friends of the Association thought it would be a degradation for the Association to apply for it. I myself thought so, but I had to yield to the arguments of Father Lafont who convinced me that as one of the objects of the Association was the diffusion of knowledge of science by lectures, and as from the funds at our disposal we were able only to fulfill that subordinate object, it would be no derogation of its dignity to tell the University that the

lectures which were being delivered within its walls would fully prepare students for the First Arts Examination.

You have to consider whether it would be lowering the status of the Association if we apply for affiliation for higher degrees. For sometime to come, some of our colleges will not be able to impart instruction to qualify their students for the new Science degrees that have just been instituted. Would not the Association be doing a service to the cause of scientific education if it could help the students of these institutions to compete for the new degrees? In addition to lectures in Physics and Chemistry and Botany, we have commenced lectures in Zoology and Physiology. We have besides practical demonstrations in all these subjects. Students, therefore, who attend the lectures and the demonstrations, ought to be fully prepared for the B.Sc. degree examination, and necessarily and *à fortiori* for the B. course of the B.A. degree which the University has proposed to continue so long as all the colleges are not duly equipped for the new Science degrees. Now, gentlemen, whether we affiliate or not, the lectures on the various subjects I have mentioned will be continued to be delivered all the same. If then by the simple formality of affiliation of the University they can be made available to students of some private institutions, why should we not do it?

Those, who think we are degrading the Association into a School, forget that the world's chief and greatest discoveries have been made by those who had or have to teach. Nothing, in my humble opinion, enables a man to learn so well and thoroughly as the necessity

to teach. We become acquainted with the weak points of our knowledge when we have to impart that knowledge to others. In experimental sciences this is the case at almost every step. In practical teaching how often has it not happened that the difficulties experienced by students in understanding a particular subject, when duly communicated to the teacher, have led to some modification of the experiments which have been the starting points of fresh discoveries ? Educational institutions still furnish the best laboratories for research. Pure research institutions have only recently come into existence. Our Association, if for want of funds, is still obliged to perform the functions of an educational institution, does not mean to abandon the main object for which it was founded, namely, original investigation. I dare say, after the promulgation of Mr. Tata's scheme, you are convinced that we require a much larger amount than we have been able to command, for making the Association a pure research institution. Those who wish it to be so constituted, have only to come forward with Mr. Tata's munificence, and the thing will be done.

If, as I had hoped, we could have endowed professorships from the start we could have had at least twenty years' work in the direction of research, and who knows that we might not have stumbled upon new discoveries ? Owing to some malefic influence of the Stars, for I cannot otherwise account for the strange niggardliness the wealthy and the enlightened have displayed in this matter, the necessary funds for the endowment of professorships were not placed at our disposal, and we have lost at least two decades of time.

While the world has been startled during this time with the most wondrous discoveries of the secrets of Nature, of new facts and new laws which govern them, we here in India have been looking on with folded hands and stolid amazement. The greatest wonder with me has been, I beg your pardon for saying so, that though never tired of boasting of our intelligence, this intellectual activity in the West has not been able to awaken that intelligence, nor even to stimulate our ambition to take part in it.

Since the inception of the project of the Association up to the present day, that is, in thirty-two years, it has got only about two hundred members. What fraction does this number bear to the population of Bengal, and to that of India? If appreciation of science is an index of culture, what a sorry figure this to represent our culture? Will you allow this reproach to continue? Bengal has up to the present taken the lead in all intellectual movements. In the matter of science-cultivation Bengal felt its necessity simultaneously with England herself, and actually had the honor of founding an association for the purpose. Will you allow that Association to die of starvation, or to dwindle into nothingness from want of proper nourishment, when a similar Institution is about to be started in a sister presidency, which from its munificent endowment promises to be full of life and vigour.

It is not an idle nor an absurdly patriotic boast which has prompted me to say that in the matter of research for want of endowed professorships we have lost two decades of time. It is my convinction that if proper opportunities had been given for the cultivation of

the intelligence that is being wasted in our country for want of those opportunities, we should certainly not have been at this time of day so behindhand as we are. Our glorious past and even the work that has already been achieved in our miserable present show that the Indian intellect is no way inferior to the intellect of any other country in the world.

On the contrary it is my firm persuasion that, paradoxical as it may seem, the Indian intellect, not only by its acuteness but by virtue of the preponderance of imagination inherent in it, is eminently fitted for the advancement of science. I know full well that it is this preponderance of the imagination in the speculations of our sages of yore which had prevented them from attaining the full truth in many a subject. I even go so far as to admit that this imagination unrestrained by the highest faculties—reason and conscience—have led to our intellectual and moral ruin. And yet I make bold to say that this preponderance of imagination in the Indian intellect will, in the present day, sobered and tempered by the truths of science already discovered, enable the natives of India to undertake the task of unravelling the secrets of nature with ease, because by its aid they will be able to take a deeper and more comprehensive view of phenomena.

I need not tell you that physical philosophers of the West have begun to appreciate the importance of the imagination in physical research. Sir Benjamin Brodie, in his presidential address to the Royal Society, in 1850, went so far as to say that "Physical investigation, more than anything besides, helps to teach us the actual value and right use of the Imagina-

tion—of that wondrous faculty, which, left to ramble uncontrolled, leads us astray into a wilderness of perplexities and errors, a land of mists and shadows; but which, properly controlled by experience and reflection, becomes the noblest attribute of man; the source of poetic genius, the instrument of discovery in Science, without the aid of which Newton would never have invented fluxions, nor Davy have decomposed the earths and alkalis, nor would Columbus have found another continent." Indeed, it may be doubted if any real discovery of science has ever been made without the exercise of this faculty. As Tyndall has well said, "without this power our knowledge of nature would be a mere tabulation of co-existences and sequences. We should still believe in the succession of day and night, of summer and winter; but the soul of Force would be dislodged from our universe; causal relations would disappear, and with them that science which is now binding the parts of nature to an organic whole."

Let it not be forgotten, however, that before it can be of real use in the investigations of science, the imagination must be under the control of reason or the critical faculty so that it may not run wild, regardless of, or in opposition to, positive facts. And this is why I still think and maintain that the best method, and under the present circumstances, the only method by which the people of India can be essentially improved, by which the Hindu and I may say the Asiatic mind can be developed to its full proportions, is by the cultivation of the physical sciences, where the imagination may take its sublimest flights, but always as a

captive balloon, though with an ever lengthening chain of positive facts which, while it gives it ample scope to soar beyond the region of the senses, keeps it bound down to the solid ground of truths already discovered.

Your Committee, by recommending the foundation of a gold medal in the name of the beloved Lieutenant-Governor, to be awarded every third year to any native of India who has carried on original research in any subject of physical science, have, in my humble opinion, done a very wise thing. For they have enabled the Association to take the first step to encourage such research not only within its own walls but beyond, the area being limited at present by the boundaries of India itself. It is hoped the time will come when original investigators will so increase that we shall have to give many more medals and more frequently, and that we shall have to specify the subjects for which the medals will be awarded.

I rejoice at the recent movement for the revival of the arts and industries of India inaugurated by Mr. T. N. Mukerjea and which is being carried on with commendable zeal and energy by Ray Parvati Sankar Chaudhuri. It was with unfeigned pleasure I listened the other day to the admirable address on the subject delivered by Mr. S. J. Tellery at the hall of the British Indian Association. But though that pleasure was unfeigned, it was not unmixed. Yes, I must confess it was mixed with pain, because it was a foreigner who appealed to us for the revival of our own arts, and thus shamed our patriotism; pain because while my countrymen were loud in their

applause of the foreigner for his appeal they have been almost deaf to the cries of one of themselves for the last thirty years for a reform which would have struck at one of the main roots of the decay and extinction of Indian arts and industries, cries which in any other country would have roused its whole people to active and enthusiastic co-operation.

The decadence of our arts and industries is due largely, but not, as Mr. Tellery and others think, solely to want of patriotic encouragement. It is true that originally all art was pure handicraft based upon mere empirical knowledge which was often kept a secret. But when empirical knowledge became systematized into science, some of the handicrafts and chiefly the most necessary ones felt the influence, and were removed from the hand to the machine partially or entirely, and the production of these arts were necessarily cheapened, and the corresponding handicrafts could not but suffer in consequence.

Then again there are arts which are based entirely upon science, whose existence, indeed, is only possible because of the pre-existence of the sciences on which they are based. Such are the art of photography, the arts of locomotion by steam and electricity, the art of electro-metallurgy, and others too numerous for mention in this place. The range of these arts is much wider than that of the mere handicraft arts. "They affect," as I said sometime ago, "the interests not of nations alone but of the whole world. They help in the development of other arts. In the present day the difference between one nation and another in the scale of civilization depends upon the amount of cultivation

of these arts or rather of the sciences on which they are founded. The backwardness of our country, indeed of Asia generally, notwithstanding the existence of arts as yet inimitable, is accounted for by the want of cultivation of those other arts and sciences." So that you see, Gentlemen, science has been the ruin of India, I mean science cultivated in other countries and neglected here. Unless you make provision for the cultivation of science by yourselves as an antidote, so as to be able to compete with the world in the production of the necessaries of life, you must be prepared for the extinction of all your handicrafts however exquisite and inimitable they may be.

But gentlemen, it is not simply for the material prosperity of our country that I am so much urging the cultivation of the physical sciences. These are but the means to an end which we have to keep in view. I see in the eye of faith that regenerated India has a mission to fulfil in the future. On the stable basis of the physical sciences she shall have to build a philosophy and a religion which will be for the regeneration of the world. The civilisation of the West, notwithstanding its profession of the blessed religion of Love preached by Jesus Christ two thousand years ago, is still, and is threatening to become more and more, the civilization of iron and blood, whose aim seems to be to polish the weaker nations and the so-called savage races off the face of the earth, forgetful or unmindful of a cardinal doctrine of that religion, that "of one blood hath God made all the nations of men." This aggressive civilization, against which the Christianity of Christendom seems to be absolutely impotent, will

have to be humanized, and whence will this humanizing influence proceed? Even at the risk of raising the smile or even the laughter of contempt at the audacious declaration, I cannnot help giving expression to my belief that that influence will proceed from India. But India must be true to herself, before she will be able to achieve that moral conquest.

Speech at the 22nd Annual Meeting, held April 27, 1899.

After the reading of the Report Dr. Sircar addressed the meeting as follows :—

YOUR HONOR AND GENTLEMEN,

Having read the report I wish I could resume my seat without inflicting upon you a speech. I sincerely wish my weary lips I could close, lips while wearing themselves must have sorely wearied you my countrymen for upwards of thirty years. But how can I, so long as I have the breath of life in me, remain silent when the cry for the dear land of our birth for reform in every department of life, is growing louder and louder. If you my countrymen hear it, as I do, I am sure you will not remain satisfied with your present condition. I am sure you will shake off your apathy and indifference and rouse yourselves to a keen sense of your duty to your country. If you remember what a country it was and what it is now I am sure your sense of duty would be keener. Listen to what a foreigner says of it.—

"If I were to look over the whole world, to find out the country most richly endowed with all the wealth, power, and beauty that nature can bestow—

in some parts a very paradise on earth—I should point to India. If I were asked under what sky the human mind has most fully developed some of its choicest gifts, has most deeply pondered on the greatest problems of life, and has found solutions of some of them which well deserve the attention even of those who have studied Plato and Kant—I should point to India. And if I were to ask myself from what literature we, here in Europe, we who have been nurtured almost exclusively on the thoughts of Greeks and Romans, and of one Semitic race, the Jewish, may draw that corrective which is most wanted in order to make our inner life more perfect, more comprehensive, more universal, in fact more truly human, a life, not for this life only, but a transfigured and eternal life—again I should point to India."

Testimony such as this cannot but be gratifying to one and all who own such a land as the land of their birth and who have the privilege of having come from such a glorious ancestry. Testimony such as this ought to kindle the flame of patriotism in even the dullest and most unthinking. Patriotism is a virtue of which the inhabitants of the poorest and most unpromising country are not devoid. Patriotism is a virtue which has been taught as a first virtue by that great Exemplar of humanity when he enjoined his disciples to preach the gospel to the Jews first and then to the gentiles. Patriotism demands that we should be worthy of our country and of our fathers. Patriotism demands that we should devote all the energies of heart and soul to advance the best interests of our country, which, I submit, we can never do if we shut

our eyes to its faults and deficiencies, and if we, with a feeble unexcitable heart, remain content merely with "the splendid wrecks of former pride."

I fully admit that the achievements of our ancestors in philosophy, morals, and religion, were something amazing, so amazing indeed as to have commanded the admiration of the greatest intellects and scholars of the West. And I, therefore, maintain that the prouder those achievements were the greater is our obligation to maintain their name. If what they did with their slender opportunities is still so highly prized, what ought we their descendants to do with certainly better opportunities at our command. I am not ignorant of the fact that adverse circumstances for a series of centuries have had a most paralyzing influence upon our energies, but those energies, as we have abundant evidence, are not altogether gone beyond recovery, and we have this advantage that we are now given, under a beneficent rule, opportunities for intellectual activity such as never existed even in days of our greatest glory.

I have been severely castigated by a patriotic editor, whose judgments I generally respect, for having dared to say that there was no science, not even the rudimens of any, in ancient India. It would not be difficult to maintain my position, which must be the position of even the humblest student of science and of history. I admit for the sake of argument that there was science even in a high state of cultivation. But I beg leave to ask where are the traces of such a state of things? Certainly they are not to be found in the voluminous literature that has come down to us

as a heritage. To characterize as science the crude speculations about nature and her laws contained in this literature, speculations which could not go beyond the five elements, would be to show the grossest ignorance of science and of the methods of scientific inquiry.

But the question is not the mere historical one, whether science did or did not exist in ancient India. The question which concerns the present most urgently is, whether science does now exist in our country; and if it does not, whether are we to remain contented with our ignorance of it, in other words, whether we are to remain satisfied with a mere literary education. But even a mere literary education has now-a-days become impossible without the light of science. For as comprehensively put by one of the greatest thinkers of the age— "To the question, what knowledge is of most worth?—the uniform reply is—Science. This is the verdict on all the counts. For direct self-preservation, or the maintenance of life and health, the all-important knowledge is—Science. For that indirect self-preservation which we call gaining a livelihood, the knowledge of greatest value is—Science. For the discharge of parental functions the proper guidance is to be found only in—Science. For that interpretation of national life, past and present, without which the citizen cannot rightly regulate his conduct, the indispensable key is—Science. Alike for the most perfect production and highest enjoyment of art in all its forms, the needful preparation is still—Science. And for purposes of discipline—intellectual, moral, religious—the most efficient study is—Science * * Necessary and eternal as are its truths, all science concerns all mankind for all time."

There is, therefore, no choice left as to the course we should pursue. If we wish to regain the lost prestige of our country, we cannot remain unconcerned with the progress of the world. I go further and say that we must take an active part in helping that progress, or we must hopelessly lag behind. There is no *statu quo* in the universe. There is progression and retrogression. The chief determining factor of progress is now and will always remain science. The amount of its cultivation in any country will thus be the chief index not only of its civilization but of its power of maintaining its very existence, as you see from the tottering condition of the Asiatic powers which, like ourselves, content with the glories of their past, are neglecting the cultivation of science.

It is true that, circumstanced as we are, we have not to maintain our distinct national existence; that is left in other and fortunately in better hands. But we have to live as individuals and communities. Must we live the lives of slaves or drudges? That is not the design of the beneficent Government under which Providence has placed our destiny. We are given full liberty to fulfil that destiny. It would be our fault if we fail to take advantage of that liberty. There is equality in the eye of the law, and it is ours to maintain that equality. Whatever there is of race-antagonism in the narrow-minded, will, I am confident, cease if we can show that there is no substantial race-inequality. The best way, in my humble opinion, to do this is not by platform blusterings and newspaper invectives, but by substantial achievements in the fields of the intellect. These fields are not and can never be closed. We are

justly desirous of having the privilege of self-government. We cannot have better fields than these for the exercise of the virtue of self-reliance and for the display of our fitness for self-government, for here we shall have help from all quarters and hindrance from none, if we only know how to help ourselves.

It is now exactly thirty years that your humble servant thought it his duty to endeavour to impress upon his countrymen the necessity of the cultivation of science as the best, and under the circumstances of the country, the only means by which the people of India could be regenerated, and elevated above their present degraded level. The outcome of that endeavour has been the establishment of this Science Association "with the object of enabling the natives of India to cultivate science in all its departments, with a view to its advancement by original research, and (as will necessarily follow) with a view to its varied applications to the arts and comforts of life." Thus Bengal has thirty years' start of Bombay in this most important matter. And yet at the end of that long period Bombay is threatening to take the shine out of Bengal. What has Bengal done during these thirty years to carry out the scheme which it had the honor of starting and formulating? It has done much. It has, since the inauguration of the Institution in 1876, that is, in nearly a quarter of a century, built a lecture hall and it has built a laboratory and furnished it with a few thousands' worth of instruments, at a total cost of about a lac and fifty thousand rupees, of which forty thousand was obtained from a prince of the Madras Presidency and thirty-three thousand from a single member in Bengal.

Thus equipped the Association has been in working existence for twenty-three years, and fulfilling one of its functions, the humblest, that is, that of diffusing a knowledge of science by means of lectures. These lectures, be it remembered, are up to this day being delivered by honorary or unpaid lecturers, with one slight exception in the case of chemistry for the last few years. And yet the public, I mean the Hindu community of Bengal, are not satisfied with the work done. That the Association should have been able to secure the services of honorary lecturers for so long a period is counted as nothing, but the disappointment is often expressed that it has not done more, that by the aid of these honorary lecturers, that is, by men who in the midst of their other and more imperative duties could, for love of science and of the people, barely spare time for the delivery of lectures, it has not enriched the world of science with discoveries of new truths. When such is the knowledge or rather ignorance displayed of the requisites of scientific research and discovery, no wonder that the Association should have been not only languishing for want of the needful support, but that it should have been blamed for not having actually worked miracles.

But while Bengal has thus been neglectful of its own Institute of scientific research, it has saluted with a chorus of high commendation the promised munificent donation of Mr. J. N. Tata of Bombay towards the establishment of a new one. In one sense self-condemnation could not have gone further. To welcome any new scheme backed by a munificent benefaction for the advancement of scientific research is what is

the duty of all well-wishers of their country. But to be unmindful of, or to ignore, a scheme already in working existence and of which we are ourselves the originators, is inexplicable on any ground of duty or policy, unless it be that we are not satisfied with the little that we have done for the carrying out of our own scheme. This is not the place to enter into a detailed analysis of the comparative merits of the two schemes. The object of both is identically the same— to fit and enable the natives of India to carry on scientific investigation for the discovery of new truths. But while the ways and means proposed by Mr. Tata for carrying out that object are too extravagant for even imperial resources, the ways and means proposed by the founders of the Science Association are reasonably economical and quite within the resources of the people themselves, if they would mind contributing each according to his capacity. The Bombay scheme contemplates the employment of highly paid foreign professors. The Bengal scheme has been advocating the employment of lowly paid indigenous men of science who, it is confidently expected, will be quite up to the work, by patient and diligent application. The methods of scientific research are no secret. Books treating of them are issuing every day from the press. With the aid of these and of scientific periodicals it is quite possible to do much real work without help from experts, and of this I can assure you from personal knowledge and experience. The Bombay scheme includes subjects, philosophical and educational, which Bengal for the present has wisely omitted. The Bombay scheme

excludes subjects, such as Astronomy and Geology, which Bengal considers necessary to be cultivated by the people of this country, and the exclusion of which from an institution intended to be a Post-graduate Imperial University does not appear to be quite logical.

The Bombay scheme requires an initial outlay of over thirteen lacs of rupees, and an annual expenditure of three lacs, which mean a total of invested capital of over a crore of rupees. Towards this Mr. Tata himself contributes, from landed and other property to be managed by the proposed University, an annual sum of a lac and a quarter, which represents a capital of about thirty lacs, and which he invites to be supplemented by contributions from the princes and the peoples of India and also from Government. His own gift is magnificent, but the question is whether the supplementing contributions will be forthcoming to make his scheme an accomplished fact. I have grave doubts about the matter, and must the scheme fall through from want of support ? It need not, if it is made less ambitious and less utopian, if it is made to fit in with the exigencies and the circumstances of the country as the Bengal scheme purports to do.

From the comparison that I have drawn between the two schemes it should not be understood that I mean any disparagement to the more comprehensive and complex one of Bombay. Any one who has watched the history of the Science Association could not have failed to notice that its projectors had as grand if not a grander ideal. If they are woking with a humbler scheme it is because they could not

command the necessary funds. They had to feel their way timidly and cautiously in order to make a beginning at a time when the name of science was scarcely heard of in this country, and when even the very rudiments of it were not taught in any educational institution except the Presidency College, where there were a few scientific instruments not for use but for misuse and disuse. It is not too much to say that it was mainly through the influence of the founders of the Science Association that examinations in scientific subjects were gradually introduced for the conferring of university degrees. For myself I can honestly say that no one hailed Mr. Tata's project with greater delight than myself. I gave the Honorary Seeretary of the Provisional Committee, that excellent young man, Mr. B. J. Padshah, the warmest reception that I could possibly give. And I am prepared to do anything in my power to make it a success.

It is now for you, my countrymen of Bengal, to determine what you are to do with the Science Association which you have established and which you have advanced so far,—whether you are to advance it further or leave it as it is to die of inanition. It cannot continue long without endowed professorships. From the very beginning I have been telling you that in order to enable the Association to do its legitimate work, that of research, you must have men devoting their whole time and attention to special subjects, and that you must provide for them. But somehow or other I have not been able to convince you of this necessity, and the result is that while we are sleeping over our oars a sister presidency has startled the country by what

appears to be a new scheme involving an outlay calculated to tax the resources of an empire. Neither the scheme nor the estimate for carrying it out is new. I have been giving out my views of both whenever I could get an opportunity for doing it. I have been giving you accounts of the cost of the various laboratories of the world, of the princely and disinterested gifts for the endowment of new professorships here, or of whole institutes there. But these stories coming from hackneyed lips have apparently had no effect. Now that I am feeling that I have come very nearly to the end of my life's journey, I do not see what more I can do than solemnly and imploringly to ask you to take the burden from off my shoulders and transfer it to yours.

My final appeal is to you, Honorable Sir. I am sure, Your Honor has accepted the office of President of the Association out of a conviction of its usefulness, and not as a mere matter of formality. I, therefore, want your powerful advocacy of the cause for which I have labored almost life-long. Your voice will be more effective, inasmuch as you have endeared yourself to my countrymen and won their confidence as few rulers had done, by large and generous sympathies in diverse ways manifested. When, therefore, I have laid my appeal before Sir John Woodburn for sympathy and support in this matter of supreme importance not alone to Bengal but to the whole of India, I must think that I have done my best, and may I hope, my last. And now, Gentlemen, all that I can do is to murmur with the prophetess of old,——

Now my weary lips I close,
Leave me, leave me to repose.

Speech at the 21st Annual Meeting, held March 21, 1898.

After the reading of the Report Dr. Sircar addressed the meeting as follows :—

YOUR HONOR, LADIES, AND GENTLEMEN,

I have first of all to perform a most agreeable duty, that of offering to Your Honor on behalf of the Association our grateful thanks for making time in the midst of your arduous duties and in the present state of your health to come here and preside at this our Annual Meeting.

The Association has been beholden to Your Honor not only since you were pleased to accept the office of its President, but from a long time anterior to that. When secretary to the Bengal Government under the late Sir Ashley Eden you, Sir, took the liveliest interest in the Association, and it was through your friendly advice and generous interposition that we were able to purchase from Government on liberal terms the permises on which we have built this Lecture Hall and the Laboratory there, and thus secured for ourselves an independent position which has enabled us to better fulfil the objects for which the Association was established.

The project of the Association was conceived and given out so far back as December 1869, and it was not till after six years' agitation, cogitation, and education of the public mind, as the late Kristo Das Pal said, that it was opened for work in 1876. So that it is nearly a quarter of a century that the Association has been working. During this time the most marvellous discoveries have been made in science in other

countries, upon which have been based inventions not only for the relief but for the aggrandisement and elevation of man's estate, which have changed the aspect of the world. During this time a most insignificant Asiatic nation has, by virtue of the assiduous cultivation of science, raised itself to the level of the civilized nations of Europe and America.

The question naturally arises what has our country, with all the advantages of a most intellectual heredity, and with all the advantages of contact with and being under the immediate direction of the most civilized, the most enlightened, and the most liberty-loving nation on the face of the earth,—what has our country, with all these advantages, done ?

Shall I be reproached with egoism if I say, the true answer to this question is furnished by the progress and condition of the Science Association ? I cannot help it if that answer does not prove creditable to the country. I cannot help it, Gentlemen, if that answer belies our oft-iterated boast of our enlightened intelligence and advanced education. It is true, that our universities are turning out at high pressure and speed graduates in the various faculties,—masters and bachelors,—by hundreds and thousands. But if we are to judge of them by the only and infallible test of—"by their fruits ye shall know them "—how would they stand ? How would they compare with their brethren of Europe and America ?

I should not be understood as being unfriendly to this result of our universities. I hail with the sincerest pleasure the progress of education so far where there was none. But I must be permitted to say that

this is but the first stage in the development of our country.

Diffusion of the knowledge that already exists is certainly the most desirable thing for any community, and specially so for ours. But to remain contented with such knowledge is to retrograde; and merely to learn parrot-like what other nations are teaching is to abdicate our position as an intellectual people, as a member of the republic of letters. Fancy what this means for India, once the cradle of civilization, of all that is noble in intellect, elevated in morals and spiritual in religion.

I am impressed more than ever with the necessity of science cultivation by my countrymen, not simply for their improvement, but, as I have been saying from the very beginning, for their very regeneration, or I would not have sacrificed a life in endeavouring to awaken them to that necessity.

I venture once more and perhaps once for all to declare it as my firm belief that in no other branch of human knowledge as in physical science is the mind so strongly impressed with the eternal and unalterable relationship between cause and effect, with the idea of law pervading the universe. Thus initiated, the mind shakes off for ever all ideas of chance and caprice and chaos from the government of the universe as false and mischievous, having no basis in living reality.

I take this opportunity to correct a misconception which seems to have taken possession of my countrymen regarding my attitude towards the moral sciences. I am generally understood, or I should rather say,

I am generally misunderstood, as losing sight of or ignoring these sciences altogether as having any influence in education. Nothing is farthest from the truth. If I could ignore these sciences, that is, if I could forget that man was essentially a moral being, then I would not have bothered my head with devising vain schemes to ameliorate the condition of my country. If it was my belief that to-morrow we die, then I would have acted quite differently and spared you the torments to which I have subjected you these long and dreary years.

Strange as it may appear to you, it is because of my faith in man as a moral being ; it is because of my faith in the supremacy of his moral over his intellectual nature, that I am so much after the cultivation of the physical sciences, not in supersession of, but as preliminary to, the cultivation of the moral sciences.

I do not say that law was not recognized in the relationship of moral phenomena before it was recognized in the relationship of physical phenomena. But I maintain that law is not so easily perceived in the former as in the latter, and from the greater complexity and consequent greater obscurity of the former the mind oftentimes is led into scepticism as to the existence of law altogether. Whereas the fact that physical laws are verifiable, that physical phenomena are capable of reproduction by a due arrangement of their causal conditions or predictable by calculation, renders such scepticism impossible, and affords the unchangeable basis on which the human mind can take its stand for positive certainty in all its investigations.

I cheerfully admit that in many instances the moral

instinct has anticipated the demonstrations of science. I cannot recall a more remarkable instance of intuition regarding the intimate connection of every part of the universe with every other, which science has demonstrated in these latter days, than in that sublime passage where Milton relates the committal of the first sin and the shock that was thereupon felt throughout creation :

> So saying, her rash hand, in evil hour,
> Forth reaching to the fruit, she plucked—she ate !
> Earth felt the wound ; and nature from her seat,
> Sighing through all her works, gave signs of woe
> That all was lost !

Such intuitions, of specially gifted minds, however true and profound, do not always carry conviction direct to humbler minds. Whenever they are felt to be for the general good they have to be enforced as religious mandates from inspired men. And having this mandatory character they must necessarily appear arbitrary, and whenever they are looked upon as unreasonable they are rebelled against.

Such is never the case with the demonstrated injunctions of science. Here obedience is imperative and unhesitatingly accorded, and the mind thus acquires a training in discipline which is invaluable. This is not the only advantage of the cultivation of the physical sciences. "A person," said Lord Lansdowne when laying the foundation-stone of the Vizianagaram Laboratory, "a person, who has received a scientific training, will, even in the current affairs of every-day life, know how to distinguish between careful argument and noisy assertion, between hasty generalizations and deliberate conclusions based upon solid premises."

And it was in this salutary tendency of scientific culture that his Lordship found justification for the encouragement by Government "of studies likely to have the effect of generating what may be called a scientific habit of mind among those who, owing to their superior education, claim for themselves the right of guiding public opinion."

There is a higher, because a much more utilitarian, motive than that of creating a scientific habit of mind among the leaders of public opinion, which should induce Government to encourage the cultivation of science by the natives of India. This is a land of oft-recurring famines and epidemics of stupendous magnitude. Our first endeavour should be to prevent their occurrence if possible, and combat them when prevention has become impossible. For the successful carrying out of both these objects a most thorough understanding of the causes of those dire calamities is necessary, and this can only be arrived at by extensive scientific research.

To take the case of famines. These are caused by failure of crops, and failure of crops result from failure of rainfall. Now if it were possible to predict the failure of rainfall sufficiently early, say at least a year before the expected failure, then provision could be made against the famine that would result from it. But our meteorology is so deficient that such predictions, on which the lives of thousands and millions of human beings depend, are far yet from the range of possibility. We still imagine freaks and caprices of nature where none exist. Here is a science which ought to be sedulously cultivated, and I am persuaded

that if so cultivated it will yield most satisfactory results. In the cultivation of this science we have hitherto confined ourselves to our atmosphere. In my humble opinion we should embrace the whole solar system, and take into account the influences of not only the sun, but of the moon and the planets, and who knows but that the stars may not exert a potent influence on our meteorology ? These can only be discovered by scientific research of the most varied and widest possible description.

Meteorology is to be cultivated in reference to famines so far as their prediction is concerned. But we have to combat them when they do overtake us. This can only be effected by a system of agriculture which will render us largely independent of unfavorable meteorological accidents ; and by the discovery of the food resources of the country, other than those already available. These objects can only be attained by the further development of Botany and Chemistry than has yet been done.

As regards epidemics, they still defy all the resources of our medical and sanitary sciences. But I am fully persuaded that if these sciences were sufficiently advanced, then those fell diseases could be brought as much under control as ordinary diseases, and there would be no necessity of having recourse to those procedures which, while they are cruel and almost savage, are yet impotent to combat them. Science properly cultivated and properly applied can never be in opposition to the purest and most cherished sentiments and feelings of the heart.

I hope what I have said has been sufficient to induce

the people of this country to cultivate science in all its departments, and induce the Government to aid and encourage them to do it. It is my belief that the sciences, however they may be advancing under zealous and earnest cultivation in Europe and America, are capable of still further advancement if cultivated with the same zeal and earnestness by my countrymen. And it is no vaunting patriotism which prompts me to prophecy that when the Indian mind with its heritage of acuteness and penetration is brought to bear upon the exploration of nature's secrets, results will be attained which will add largely to the stock of human knowledge.

There is even a higher motive still, the highest if I may venture to say so, because above all utilitarian considerations, which should induce our Government to encourage to the utmost the cultivation of science by the natives of India. It is no mere chance which has placed the destinies of this vast and once glorious country in the hands of the British nation. If, as one of England's greatest philosophers said, "the dignity of the commandment is according to the dignity of the commanded," then I make bold to say that the British nation will not have fulfilled the mission for which Providence has appointed them till they have done their best to raise the Indian people to a level with themselves.

The task before the Government is not I believe a hopeless or an impossible one. The material to work upon has, it is true, from long misfortune, degenerated considerably, but I repeat what I have so often said, that the old Aryan vigour of intellect in the Indian people is only dormant and not dead. At our

nineteenth annual meeting I alluded to the success which has attended the labors of Prof. Jagadish Chandra Bose in Electricity as illustrating my faith in the powers of the Indian mind in the field of science. I have now the pleasure of adding two other instances, those of Mr. Prafulla Chandra Ray and of Babu Jyoti Bhusan Bhaduri, of success in the no less difficult field of chemistry. These gentlemen could not have achieved the successes which have commanded the admiration of European scientists if they had not the advantage of working leisurely at the laboratories of the Presidency College furnished and equipped by Government. There was a time when our laboratory was richer than that of the Presidency College and when we had to hold practical classes for the students of some of the other colleges in Calcutta. But the attention of the Government was soon drawn to this defect, and the Presidency College has now a laboratory worthy of the premier College in Bengal. It is a matter of no small regret to me that want of funds should not have enabled us to compete with Government in this matter of healthy rivalry.

But a hard experience of thirty years tells me that we still require the stimulus of Government countenance to make us liberal and charitable. How happy would I have been, and how high would they have risen in the estimation of the civilized world and specially of our Government, if my countrymen, so ardently desirous of self-government, had shown their fitness for it in a matter in which self-government would have been hailed with joy by even the most despotic government in the world.

It is both an interesting and an instructive problem, psychological and scientific, worth solving for our own sake, namely, why has this Science Association up to this time failed to enlist the sympathy and support of those for whom it was designed and established. Is it because its objects have not been clearly set forth ? It cannot be so, because however much I may have failed in explaining them, they were clearly and vividly and I may say authoritatively placed before the public by successive Viceroys and Lieutenant-Governors who gave the most convincing proof of their sincerity by not only becoming our Patrons and our Presidents in name, but by actually contributing to our funds, and by attending our meetings, in the midst of imperative and imperial duties, in order to exhort us to do good to ourselves.

But not only has the clearest exposition been given of the objects of the Association, but as illustration of the amount of fund necessary to carry them out the costs of the various laboratories of the world have been placed before the public, compared to the least of which the fund which we have been able to realize sinks into an utterly insignificant and ridiculous figure. In addition to the costs of starting and maintaining those laboratories, we have the example of princely benefactions of single individuals to stimulate us ;—benefactions amounting from thousands to lacs. For some reason or other which I cannot find out, these facts and examples make no impression upon us.

Over and above this general apathy and indifference, there seems to be, I am sorry to notice, positive antagonism towards the Association. And strange

as it may appear, it is a fact and a fact that will remain a blot in the national character of the present time that the Association, though struggling for existence for upwards of quarter of a century, is ignored and even looked down upon with cold disdain by those whom it gave not only the heartiest welcome but gave all the help and encouragement in its power to work within its walls.

But notwithstanding that the progress which the Association has made is annoyingly slow, notwithstanding that unfavorable, unfriendly, and even inimical influences are at work against it, I am not despondent. Unless I relinquish all faith in Providence I cannot lose faith in the future of my country. And I have stronger reasons than ever to believe that that bright future would be through the fields of science. I am therefore firmly convinced that if once a taste for science is created among my countrymen, science will count her votaries by hundreds and thousands, instead of scarcely, as now, by units. And a day will come when India, of her own accord, unaided and unsolicited, will equip and send out scientific expeditions, as is now being done by the more favored countries of the West. No part of the world requiring exploration will be without explorers from India. Not a single phenomenon can occur, either in the heavens above or in the earth below, which can be predicted beforehand and the observation of which might be of scientific interest and importance which India will not send her scientific men to observe and record. Is this a dream? Yes, it is; but it is one of those dreams which with adequate funds can be made as much a reality as any-

thing in nature. It is in your power, countrymen and young friends, millionaires and poor students, to hasten the advent of that day which will regain our country her lost prestige.

The most important question is, where is all this money to come from ? I should not say, from the Government of the country, for that would mean taxation, and taxation means grinding of the poor. The money ought, in my humble opinion, to come from the rich whose wealth is ultimately traceable to the sweat of the brow of the poor. In contributing towards the advancement of science the discoveries of which tend more for their benefit than for the benefit of the poor, the rich only repay a double debt which they are bound in all fairness to pay.

I may be asked if I do not require money aid from Government what do I mean by wishing it to encourage to the utmost the cultivation of science by the people of this country ? I simply mean that Government should employ indigenous men of science in its service and recognize institutions like this if they can prove themselves worthy of such recognition. I need hardly add that money or other aid spontaneously given without interfering with our liberty would also be substantial encouragement and would be most welcome.

Speech at the 20th Annual Meeting, held Sep. 11, 1897.

After the reading of the Report the Honorary Secretary spoke as follows :—

Gentlemen,—It will be a comfort to you that, not being well, it is not in my power to make a long speech. Nor do I think that at this the twentieth annual meeting of the Association it is necessary for your Secretary to make a long speech. All that he has to do is to iterate and re-iterate what he has been urging since the foundation of the Institution, namely the necessity of national support to it to render it worthy of the India of the past of which every Indian is so justly proud. I am not tired of this iteration and re-iteration, and, I hope, honorable colleagues, neither are you, nor our countrymen at large. If we were, we should be displaying our want of faith in progress, which means, in the providence of God. We might well be the victims of chill despair if we had not this faith which has been truly described as the evidence of things not seen but sure to come.

Whether our Association will endure to continue to be the regenerating influence for our country may still be in the region of doubt, but if the relationship of cause and effect be eternal then I can assure you, gentlemen, that circumstanced as our country is it will have to advance, unless otherwise doomed by an eternal decree,—it will have to advance, I say with all the emphasis in my power, through the regenerating influence of science and of science alone and that, therefore, other but similar institutions will have to take the place of ours. It will depend upon you, gentlemen, whether this Association, which you have founded and advanced

so far, will continue to be what it was destined for, or cease to exist from want of the necessary support and thus fail to enlist and utilize native thought and native research in the cause of the advancement of science. It will depend upon you whether your names are to be handed down to posterity as the blessed pioneers of this beneficent reform, belonging to "that band,"as Lord Lytton beautifully said, "that little band it may be now, but which is destined, year by year, further and further, to carry throughout the length and breadth of India the ever widening light of the great practical truths which belong to Science."

You, gentlemen, the founders and supporters of the Association, have done your duty most nobly so far as your own donations and subscriptions go. In every case these donations and subscriptions have been highly liberal, worthy of your enlightenment, and in some cases they have been princely, indeed, truly Indian. Be not offended, honorable colleagues, if I beg leave to tell you that in the circumstances of our country, money contributions alone are not sufficient. I do not allude to the present calamities of famine and plague and earthquake which have overtaken our unfortunate country. I allude to worse calamities, the degradation and degeneration which we have been undergoing for centuries, and for the remedy of which I have been advocating the cultivation of science.

Yes, gentlemen, you shall have to supplement your money contributions by contributions of a higher character, you shall have to give your heart and soul, nothing short of which will satisfy your humble servant or proud beggar, if you like. I am neither afraid nor

ashamed to make this demand, because I am conscious that I am doing it for the sake of the country which we all love, and not for myself. You will not have done your duty in the matter until you have roused the whole country to co-operate with you. It will not be difficult for you to achieve this, if each of you will set to work with the zeal and earnestness of genuine conviction. Each of you will have to act the part of the missionary in order to produce conviction in the minds of others by the happy contagion or enthusiasm of your own.

I have taken the liberty to speak to you in this strain because, with daily growing infirmity from age and disease, I am feeling my incompetency more and more to carry on the work which you have been pleased to entrust me with. The break-down in my health has been so complete that I have become absolutely despondent of ever being able to resume the duties of lecturer.

You will remember, gentlemen, that at our sixteenth annual meeting, held in May 1893, I told you that "it is true that the Association has hitherto been able to command honorary lecturers, two of whom have been giving their services gratuitously and ungrudgingly ever since its foundation, that is, for sixteen years, and will continue to do so, as long as it will please Providence to spare their strength. But it must not only be remembered that they are not immortal, but that we require men who shall be free from other occupations in order to be able to devote their undivided attention to special subjects."

Little did I think at the time I uttered these words

that in the space of the short peroid of four years they will come to be almost literally fulfilled. It is true that the two honorary lecturers here alluded to are in the land of the living, but they are no longer the young men they were when the Association was established; their strength is failing, and one of them, our beloved and Reverend Father, partly from this cause and partly from having to perform duties which are imperative and cannot be neglected, has very reluctantly been obliged to give up systematic lecturing at the Association. The other, as you have already learned, is in a worse predicament.

This fact ought, in my humble opinion, to be a warning to us that the sooner we cease to count upon the services of honorary lecturers, the better would it be for the stability of the Association. I do not say that with the loss, from causes given, of Father Lafont and your Honorary Secretary as lecturers, the Association will no longer have the gratuitous services of others. The report of the past year shows that for some time yet you may continue to have such services. But what I maintain is that it is not right and proper that you should have them for indefinite time. For, in that case there would be no progress, and the Association would not be fulfilling the object for which it was established.

The stream of liberality in the matter of science endowment, as indeed of all other educational endowments, must ceaselessly flow, or progress will cease. You all know how rich these endowments in Europe and America already are and yet the people of those countries are never satisfied with them as sufficient.

Every year there is a cry and demand for more and more, and every year almost the demand is being met by countributions of a more and more liberal character.

You are all acquainted with the history of the Royal Institution in London and of its achievements, how from the very beginning of this century it has turned out some of the greatest men in science who have enriched the stock of human knowledge with some of the most marvellous discoveries. The people of Great Britain might well have remained satisfied with these achievements, and the managers of the institution contented themselves with making the most of the means and appliances already in their possession. But they were not. They felt the need of greater expansion and development of their resources in order to prosecute the cultivation of science with greater vigor, and this healthy dissatisfaction of theirs has met with a rich reward in the shape of a most munificent endowment.

Dr. Ludwig Mond, at a cost of a hundred thousand pounds, which means no less a sum than sixteen lakhs of our rupees, has established and equipped a research laboratory for the Royal Institution, and "named it the Davy-Faraday Research Laboratory in perpetual memory of those two great pioneers of science who carried out their world-famed and epoch-making researches almost on that spot and whose example he hoped would stimulate and inspire every one who come to work under that roof." The sum of 38,000*l.* has been sunk in the building and its equipment, and the remaining 62,000*l.* has been invested as the endowment fund. Dr. Mond, in addressing the Prince

of Wales, who opened the Laboratory on December 22nd of the past year, said: "The further we advanced in the study of nature the more accurate and elaborate was the apparatus required, and the more difficult it became to carry on delicate work in a private laboratory. He had placed that laboratory in the centre of London because he believed that this great city would continue to be the intellectual centre of the civilized world, where the brightest minds would congregate. He had intrusted it to the Royal Institution so as to ensure its being open to men and women of ali schools and of all views on scientific questions."

If any argument were needed for the establishment and perpetuaation of a Science Institute in the Metropolis of India, it is furnished by this magnificent act of benefaction and the manner in which it has been made. There are numerous institutions in Great Britain where the prosecution of scientific research is going on, and yet Dr. Mond thought it advisable to erect a research laboratory in London, "the intellectual centre of the civilized world," and in connection with an already existing institution in order that it may be "open to men and women of all schools and of all views on scientific questions."

Here in India we have, properly speaking, no other institution than this Science Association in Calcutta, where any one who chooses, man or woman of any class, race or creed, may engage in the sacred task of exploring the secrets of nature,—of penetrating into the mysteries of God's works. And may we not, without vanity, look upon Calcutta as the intellectual centre of India? Can the most enlightened liberality

of this country find a more deserving object for its beneficent exercise than a proper endowment of this Association of ours? Are there none amongst our millionaires,—our zemindars, our rajas, maharajas, and chiefs,—who are willing to follow the example so nobly set by Dr. Mond in England? They ought to remember how deeply they are indebted to science, cultivated in other countries, for the comforts and the luxuries they enjoy and which have become the very necessaries of modern existence. They ought to make some return for this, and what better return can we possibly think of than generous and liberal help in the advancement of science?

In making this return the donors may be individually and personally losers of certain sums of money, but their country and countrymen will be immense gainers, and surely there is patriotism enough in all of them to incline them to make the sacrifices demanded by the vital interests of the land of their birth, the land of a glorious ancestry.

A hard experience of a quarter of a century compels me to make a reluctant confession. When I conceived the project of our Association, while my chief reliance was upon large subscriptions, I had faith also in small ones. At the opening of the Lecture Hall by Lord Ripon in 1884, the year of the Exhibition, I ventured to say: "There are in Bengal, several wealthy and enlightened men who can, if they but will it, each found a professorship. There are hundreds who can easily pay a thousand rupees each, there are thousands who can easily pay a hundred rupees each, there are hundreds of thousands who can pay a rupee each, and

as the Exhibition has shown, there are millions who can pay, without feeling the loss, four annas each."

My political economy, however theoretically correct, does not appear to be practicable. The country, you may say, has not risen up to it. It may be so, but, in my humble opinion, in matters for which very large sums are required, the money ought to come from the rich for whose benefit the poor labor with the sweat of their brow. And, indeed, the money of the rich may be ultimately traced to the poor who are hardly given any advantage in the hard contests for existence. I am not sorry, therefore, that for the present at least I shall have to give up all hope from four-anna and rupee subscriptions.

Gentlemen, I must conclude, but I cannot do so without apologizing to you for the delay that has taken place in the holding of this annual meeting. This has been due to an illness the recovery from which I had despaired of, and consequently I had very little hope that I shall have again the pleasure of appearing before you. God has spared my life, but only to enable me to beseech you that you should no longer put your reliance upon me but take upon yourselves the performance of your own duties, which means the continuance of the work you have so nobly begun in the cause of science, a cause which, to quote again the words of Lord Lytton, "here in India is really of all causes the most deserving, the most beneficent, and the most charitable."

Speech at the 19th Annual Meeting, held Aug. 19, 1896.

After the reading of the Report Dr. Sircar addressed the meeting as follows :—

Gentlemen,—It must be a relief to you to learn that I am not going to inflict a speech upon you. The chief burden of my speech from year to year was the endowment of professorships, with special reference to the one which the Association resolved to found in the name of Lord Ripon so far back as 1884, that is, twelve years ago, for which we had not only his lordship's permission but his donation of a thousand rupees. From the report of your Committee which I have just read you have seen that two members of the Association have out of pity to the secretary, for which he cannot be too thankful, removed that burden from his to their shoulders. They have not only come forward with munificent donations, but have determined to see that at least the Ripon professorship fund do not remain a standing disgrace to the Association and a blot upon our national character, the noblest feature of which has in the past been gratitude. I only hope that Justice Gooroo Dass Banerjea and Babu Ganesh Chunder Chunder's example and practical appeal will bear fruit, and that before the year expires we shall be in a position to carry out the suggestion of the Committee, namely, to endeavour to secure a whole-time professor as soon as the realized donations give us an income of Rs. 100 a month.

You no doubt feel that the Association must be in the lowest stage of evolution, when it has not yet been able, after an existence of twenty years, to provide

even so poorly for a single professorship, that is, for a man who can carry on investigations within its walls, unhampered with the thought of providing for the simple necessaries of life. Each of you, therefore, gentlemen, who have helped in establishing the Association with the object of enabling your countrymen to cultivate science in all its departments, ought not to rest contented till you have enabled it to fulfil that object. You have to see to the endowment not of one but of several professorships. For it is no longer possible for one man to cultivate all the branches of science, though a general acquaintance with as many of them as possible helps in the proper and successful cultivation of special branches.

The branches of science have multiplied so much in these days that fifty professors for a scientific institution would not be too many. And there are in fact institutions in Europe which do actually maintain such a number of professors. I do not expect that number in our Association within the life-time of any of us here present, though if funds were forthcoming the thing is not beyond the range of possibility. But under the circumstances of our country, to think of so many professors for our Association would be but indulging in an idle dream. I must therefore limit myself to speaking of such professorships as are an imperative necessity. After physics and chemistry, the next subject that has a legitimate claim upon our attention is biology. Before providing for physics I could not venture to ask for the endowment of a chair for biology. But now that some provision has been made for chemistry by H. H. the Maharaja of Cooch Behar's

monthly subscription of Rs. 100 a month, and assuming, which Justice Gooroo Dass Banerjea and Babu Ganesh Chunder Chunder have enabled us confidentally to do, that the Ripon professorship will ere long be an accomplished fact, I think I may now go about with a begging bowl for biology in hand.

I am glad to tell you that I do not appear before you with altogether an empty bowl. At the Hare Anniversary held here in June last, one of our colleagues, Babu Nilmani Kumar, read an address on the Calcutta Medical College, which in its infancy was an object of Hare's philanthropic solicitude and care, and thus concluded the address: "Before resuming my seat, I beg to make a suggestion, the adoption of which, I humbly think, will perpetuate the memory of David Hare better, because more fittingly, than the statue which was erected by his immediate pupils. The suggestion is, to invite public subscriptions for the establishment of a professorship in his name in this institution (the Science Association), which may be said to have owed its existence to his influence, because founded by one who commenced his education in the Hare School and completed it in the Calcutta Medical College."

The meeting, before which this address was delivered, was a large one, and the following resolution was passed: "That this meeting is unanimously of opinion that the suggestion of the learned lecturer be carried out, namely, that a professorship in the name of David Hare be established in connection with the Science Association, and that the enlightened and generous public be invited to make suitable contributions towards that object." You will, I doubt not, be pleased

to learn that the mover of the resolution was no less a person than our distinguished colleague, Dr. Gooroo Dass Banerjea, who, in the course of an eloquent speech, suggested that the subject of the professorship should be biology ; and what is of more interest to us is that he did not rest contented with moving the resolution, but came forward with the first subscription, the munificent sum of Rs. 1,000, in aid of the professorship. This created such an enthusiasm amongst the audience that a further sum of one thousand three hundred and six rupees was subscribed on the spot ; so that altogether I have promise of Rs. 2306 to begin with.

No further advance has since been made, but that is, I believe, simply because the public of Calcutta and the people of Bengal have not been made sufficiently and properly acquainted with the object and importance of the professorship. My pursuasion, Gentlemen, is that this is the case with the Ripon professorship, and, indeed, with the whole scheme of the Science Association.

I must confess I have not been able to do my duty at all adequately in this matter. I have not succeeded in impressing my countrymen with the importance of science-cultivation as under the present circumstaaces thc most important factor of not only their improvement but of their actual regeneration. I have certainly not succeeded in inspiring the general educated community with love of science, far less with missionary zeal and enthusiasm for its propagation. It would be the height of ingratitude in me to say that I have derived no help from my educated countrymen. All the help, in fact, has come from them, but this was

spontaneously rendered, without any prompting from me. And the number of those who have so helped is few, very few, indeed, infinitesimal, compared to the number who may be said to have received a liberal education. The fact remains, that the majority of our educated community have not awakened to an adequate sense of their responsibility in this matter of supreme importance; which you may interpret, if you like, as meaning that, from whatever cause it may be, I have not been able to reach the mind and the heart of that community which alone can influence the country.

If you are inclined to take an indulgent view of the situation you may take it that it was not possible for one man, weighted with other duties which could not be safely and conscientiously neglected, to do all that was necessary to be done in order to carry out such a large scheme as that of the Science Association, for which both the material and the moral support of the whole country is required. If you will be pleased to take this indulgent view then I may consider my own humble work done.

I have all along maintained that the original aryan vigour of intellect, which in the past caused the light of knowledge to radiate from our country to the rest of the world, is only dormant in us and not gone beyond re-awakening. That I am not a visionary or a vaunting patriot has been proved beyond the shadow of a doubt by admittedly superior display of intelligence in other fields than pure science, and very recently even in the field of pure science itself. I allude to the success which has attended the labors of Professor Jagadish Chandra Bose whom, some of you may remember, I was the

first to welcome in this very hall as a young man of promise. He has kept his promise exceedingly well. I can scarcely express in words the delight I feel at his success, and I sincerely tell you that that delight could not have been greater than if he had been my own son, or if I myself had been in his place. Indeed, Gentlemen, if I could lay bare my heart I could have shown you I am rejoicing much more simply because he has shown that Indians are not mere speculative and unpractical dreamers, but that they can, if they but will it, be as practical as any nation on the face of the globe.

Yes, Gentlemen, you have but to will it, and victory even in the domain of practical science is yours. What is it which prevents you from taking that determination? What is it that has produced such an intertia of the will as to render you so unmindful of your best interests? The answer to this question furnishes, in my humble opinion, the key to our decadence as a nation, and suggests also the means by which we can not only regain our lost prestige, but even yet take rank with the most civilized nations of the world. So long as we were earnest and diligent in exploring the secrets of Nature we had mastery over her and could hold our own, but from the moment we gave ourselves up to luxury and ease and were taught by an idle priesthood to depend upon invoking the aid of the gods without doing the necessary work ourselves, we began to fall from our high estate, and our present condition shows how great has been that fall. The moral is obvious, and my whole life has been spent in preaching it to my countrymen, I hope not in vain.

Speech at the 18th Annual Meeting, held July 30, 1895.

After having read the Report, Dr. Sircar addressed the meeting as follows :—

YOUR HONOUR AND GENTLEMEN,

The report, I have just read, is similar to its predecessors with the exception of one point in which it shows progress in a new direction, and that is the opening of the Biological Section. Considering the importance of Biology, the Management of the Association are certainly to be congratulated on having been able to open courses of lectures on the subject available to students and the general public. But though this indicates progress there is a drag in that progress in the fact that the new courses have to depend upon honorary lecturers, which does not allow us to be quite jubilant over that progress.

And, indeed, the fact that, with the exception of Chemistry, we have yet to depend upon honorary lecturers in the other subjects also, in physics and the higher mathematics, and that the remuneration which, through the munificence of His Highness the Maharaja of Cooch Behar, we are able to give to our lecturer of Chemistry, is not such as to command his or any other chemist's whole time,—this fact is still weighing heavily upon the mind of your Committee of Management.

It is due to myself to tell you that I urged the necessity of paid professorships before the Association was actually established. In the sketch that I gave in 1875 of my scheme of the then projected Association I said :

"There will be no want of workers if we could only

provide for them, and we must provide for them, that is, remunerate them properly, if we want to get good steady work out of them. I have no faith in unremunerated workers. We must not forget that men have stomachs as well as minds. The mind must have leisure to think that it may think with any advantage, and this can only be secured by providing for the demands of the stomach. In Europe and America this leisured thinking is secured largely by state and other appointments. In our country such appointments do not exist, and it is chiefly with a view to supply the deficiency that I have been striving to found this Association."

This was written on the 16th Dec. 1875, and the Association was formally established by resolution of the subscribers, under the presidency of the then Lieut.-Governor, Sir Richard Temple, on the 15th January 1876.

I had roughly estimated that the monthly expense of the Association, including Rs 300 for three leetures or workers as I then called them, would be Rs 500, and this sum, in my inexperienced simplicity, I expected to realize by monthly subscriptions of Re 1 a month! In moving the resolution for empowering the Committee of Management to invite monthly subscriptions—the minimum subscription of Rs. 12 per annum entitling subscribers to the privileges of membership, the late Babu Keshab Chunder Sen observed, "I am not sanguine, I must say, about the realization of so large a sum every month. But we may well rely upon Dr. Mahendra Lal Sircar, who, I confess, has displayed wonderful power and tact in raising funds from all classes of the native community."

It was neither talismanic power nor tact which enabled me to raise subscriptions. The first subscriptions came spontaneously from our enlightened millionaires. It was this fact and the unanimous support which was given to my project by the whole press of India which, strengthening my conviction of its soundness, enabled me to gradually create a healthy public opinion in the direction of the necessity of the cultivation of the sciences by my countrymen. And I am sure that had it not been for a rival project which pretending to be practical proved visionary in the extreme, the Science Association would not only have succeeded in realizing Rs. 500 a month, but would by this time have been in as flourishing a condition as we could desire.

But the rival project of starting a technical institute without preliminary scientific education so unsettled and misled the mind of our community as regards the absolute necessity of science-cultivation for the success of any scheme of practical applications, that the stream of sympathy and of substantial encouragement that was flowing in aid of the Science Association was rudely checked and diverted to barren and unprofitable regions, or rather I should say, to regions which existed only in the imagination of the projectors. The rival scheme could not, in the nature of things, be long-lived. Indeed, it died as soon as it was born. But the mischief done by those who helped it at its birth has been disastrously permanent. The popular mind, not over-informed any where. and grossly ignorant in this conntry, has not yet recovered from the spell which the sound of the word 'practical' bound it twenty years ago.

The fact remains that though the Association was established with the express intention of paying its workers from monthly subscriptions, the painful discovery was soon made, as was apprehended by Babu Keshab Chunder Sen, that the necessary sum could not be got on paper, far less realized. The Association has accordingly been depending upon honorary lecturers from the very beginning. And it is only since 1892 that we have been able to pay some remuneration to our lecturer on chemistry, though as already said, not adequate enough to command his entire time.

It was not till the most pressing requirement of the Association, the building of a lecture hall, was met, that we could venture to speak of the endowment of professorehips, as another of our pressing requirements without which indeed the permanency of the Institution could not be assured. Accordingly on the day Lord Ripon laid the foundation-stone of the lecture hall, I made my appeal for funds for the endowment of professorships. "The present lecturers," said I, "are rendering their services gratuitously, out of pure love of science, and out of regard for the advancement of the natives of this country, but they cannot continue to render those services for ever. And neither can we expect, nor ought we to expect, that we should always be able to command honorary lecturers. This is neither possible nor desirable. We must have men continually at work, observing and experimenting and investigating, within the walls of the Institution, in fact, devoting their lives to the cultivation of science, in order that we may have natives of this country contributing to the advancement of human knowledge, for

which specific object this Institution was projected and has been established."

Two years later, in 1884, when the lecture hall was inaugurated by the same Viceroy, I once more urged the necessity of endowed professorships, and a fund for one professorship was actually started. His Excellency not only gave us permission to call it after him, but gave us a substantial donation of Rs 1,000 in its aid. H. H. Sivaji Rao Holkar, then first Prince of Indore, now Maharaja, gave us permission to divert his donation of Rs 1,000 to this fund. With characteristic liberality, H. H. the Maharaja of Durbhanga subscribed Rs 10,000 in aid of the same fund. But sad to say, after the departure of Lord Ripon, at least, this has been the coincidence, the fund has improved but little, notwithstanding our repeated appeals in its aid. After 1886 it has come to an absolute stand still, a fact which so much surprized Sir Steuart Bayley that in addressing the members and assembled guests at the annual meeting in 1888, he was compelled to put the question, "In this wealthy city is Lord Ripon's name then forgotten?" and instead of waiting for a reply added, "but I would rather leave you to draw the moral, and content myself with reminding you of what Lord Ripon himself said that 'a single school founded, a single college aided, nay, a single scholarship provided, will do, in the times which are before us, more to uphold the honor of an ancient name or to create the reputation of a new one, than any outward show of dignity or any personal display of wealth."

The Committee of Management, after having year after year regretted inability to report any improve-

ment in the fund, have for very shame abstained from even alluding to it. But the importance of a professorship endowment fund, especially when coupled with the name of a most popular Viceroy, is so great that I cannot let slip this opportune and I might say this auspicious occasion without bringing it prominently forward once more to the notice of my countrymen, Hindu, Mahometan, Parsi, and all who take pride in the name Indian.

I have called this occasion opportune and auspicious because we have the privilege of holding this meeting under the presidency of a ruler who has evinced genuine earnestness in the cause of science by substantial encouragement, not encouragement by word of mouth only, but by the actual endowment of a prize for original research in the adjudication of which an honorable place has been given to this Institution. Considering the occasion then, may I not hope that those of my countrymen present here will enable me to announce at the next annual meeting that the Ripon professorship has become an accomplished fact.

I may be permitted to point out that the failure to found a professorship in the name of Lord Ripon would be a serious reflection upon our gratitude and our sincerity. The enthusiasm that was displayed in honor of his lordship throughout the length and breadth of India was phenomenal at the time. Was that enthusiasm sincere? might well be asked when we have literally done nothing to perpetuate his memory. If it was sincere, how is it that our gratitude followed suit with the smoke of the fireworks with which his lordship was entertained at Belgatchia,

that is to say, evaporated and did not settle down into something solid and substantial ? And what thing more solid and substantial could possibly be imagined than what we are now speaking about, which would not simply be a token of our sincerity and of our gratitude but would benefit us without measure and for ever ?

But, Sir, it is not in aid of the endowment of this one professorship, however important to endow for the sake of our national character, that I want your powerful voice. Those who have even the most superficial knowledge of what and how the nations of the West are doing for the cultivation of the sciences ought to know what number of professorships we require for an Institute of Science which professes to be, and deserves to be, and may be made to be, a national Indian Institution.

First in the field to awaken the people of India to the necessity of the cultivation of the physical sciences as the best and indeed the only method by which they can be essentially improved, by which the Asiatic torpor of ages can be shaken off, by which the lost prestige of the Indian sages as the educators of the world in primeval times, can be regained,—would it not be a pity if such an Institution were to languish for want of support ? And would it not be a greater pity still if after having advanced as far it has done, it is suffered to die of inanition, or worse, to dwindle into a sorry and miserable thing for ever bearing witness to the want of energy and enlightenment of the present Indian people ?

Now what is the advance which the Association has made during the twenty years it has been in working

existence ? This is not altogether inconsiderable if it is borne in mind that it has been in receipt of Rs. 1,92,338 as donation, including the Rs. 25,000 of Babu Kali Kissen Tagore for instruments and the Rs. 40,000 of the Maharaja of Vizianagram for the laboratory building ; and Rs. 20,000 as monthly and yearly subscriptions. By judicious investment of this sum the Association has made an income of Rs. 61,000 in the shape of interests from Government securities and Rs. 20,000 as rent from the road-side shops. It has altogether spent Rs. 1,80,000 of which the sum of Rs. 31,000 was spent in the purchase of the premises on which it stands, Rs. 30,000 in building the lecture hall, Rs. 41,000 in building the laboratory, about Rs. 36,000 in the purchase of instruments, about Rs. 3,000 in furniture and Rs. 2,000 in books and periodicals, and nearly Rs. 8,000 in municipal taxes, and the balance of Rs. 28,000 in establishment, charges general, lecture charges, lighting, &c. As regards the number of lectures delivered, in place of two in the month with which the work of the Association was begun, there are now six a week or twenty-four in the month during the working session.

"We must, therefore, gratefully admit," with the *Hindoo Patriot*, "that Bengal, and especially the Metropolis, has done much for the cause of science. But it must be equally admitted that much more that could have been done has not been done. We see only the names of a few millionaires on the subscription list, and it is their names which recur on different occasions. How many there are who can come forward very liberally, but have not done so ! What

more convincing proof do they require of the utility and the importance of the Association than the testimony, in eloquent, earnest and often impassioned words, borne of that utility and importance by successive Viceroys who have been its patrons, and by successive Lieutenant-Governors who have been its presidents ?"

"But it is not our millionaires alone," continues the same journal, "who are to blame for their apathy and indifference to the cause of the Science Association. The institution has not met with that appreciation from the bulk of our community which it was expected in the beginning that it would. This means the apathy and indifference of the educated classes, who are and ought to be the proper representatives of the country. Education has not, it is true, reached the masses. But what increasing numbers of graduates are being turned out year after year by our universities. To them the advantages of science-cultivation in this country cannot be matter of doubt. And yet we do not see that they have moved in the matter adequately to their numbers and their culture. We do not see that they have come forward either with their purse or with other help at their easy command. We do not mean to say that there are not honorable exceptions, but how few, how solitary these exceptions are! We do not exaggerate when we say that we have scarcely found a single graduate who has tried to persuade others to help the institution. If our graduates had shown any earnestness in the matter, and acted the part of the missionary in the cause of science the Association would have worn a different and

brighter aspect. The rules of membership have placed it within reach of every one with moderate income."

I think I have made clear what is expected from my countrymen, from the wealthy and the learned, as regards this institution. I will here quote an important observation which was made by the Hon'ble Mr. Cotton in his address on Technical Education at the Bethune Society some years ago, which has a most pertinent bearing on what I have been so feebly urging. "A most urgent need in India," said he, "is the better disposition of hoarded wealth. India is in need of wealthy men who have wisdom and experience, who will not fritter away their money on *tamasha* and ceremonies, and who are not unwilling to lay out capital which will bring them neither titles nor official smiles. We do not want capital to be buried, we do not want it to be wasted on marriage expenses, nor do we want it to be squandered in sycophantic subscriptions or in the reception and entertainment of officials. Some expenditure of this kind will always be unavoidable, but the waste which now runs rampant must be checked. No spectacle is more deplorable in the eyes of the well-wishers of this country than the lavish squandering outlay which fashion demands and public opinion sanctions on these occasions." I have only to remark in this connection that we have two kinds of hoarded wealth in this country, one in the shape of gold and silver and the other in the shape of unused intelligence. In order to liberate the latter it is necessary, as I have often said, to liberate the former, which in this sublunar world of ours is a magic transformer of energy of all kinds.

And now, before I resume my seat, a word as to what I expect, and may legitimately expect, from Government. Lord Lytton, when he paid a visit to the Association in 1880, to be present at one of its lectures, in addressing the audience after the lecture, said, "and let me beg you to remember that the cause of science here in India is really of all causes the most deserving, the most beneficent, and the most charitable." Lord Ripon marked "the deep and sincere interest he felt in the progress of the Association—an interest which," his Lordship said, "increased with his increasing acquaintance with the wants of India," by contributing liberally to its funds. Lord Lansdowne, also a contributor to its funds, when laying the foundation-stone of the Vizianagram laboratory, said, "I am convinced of the great value of the work which the Indian Association for the Cultivation of Science has done in the past, and is likely to do in the future," and added, "I shall be expressing the general opinion of those who stand around me when I say that, living as we are in an age remarkable for the number and brilliancy of its science discoveries—an age in which every civilized nation is contributing its quota towards the general fund of scientific knowledge—we should be reluctant to think that India, considering the intelligence of many of the races by which it is inhabited, should fail to bear its share in extending the dominion of man over the natural world."

I need not here recount what your predecessors in the presidential chair said and did for the Association. Your Honor has gone further than all of them when in presiding at our annual meeting in 1891, you were

pleased to observe—"*it is quite right that Government should support and encourage every thing that is done to promote the growth of the love of science in India.*" It is these words which have emboldened me to say my humble say, as I am now doing, as to what we may expect from our Government. We are thankful for what the Government has already done for the Association by its moral support, and by acquiring the land on which its premises stand.

But it can do much more in a variety of other ways without any appreciable charge upon its finances. For instance, it can furnish the institution with instruments made at its workshops for its meteorological, mathematical, telegraphic and other departments, at little or no cost. It can supply it with spare specimens from its geological and other museums. And it can order copies of all its scientific publications to be sent for the library of the institution.

There is one other thing which I humbly beg to suggest Government can easily do, and which is calculated to benefit the Association immensely by drawing students to its lectures and practical demonstrations, and that is by passing some such resolution as this—that candidates for Government service requiring a knowledge of science will have preference if they can show certificates of having passed through full courses of instruction at the Science Association. While this will be a very great encouragement to students, it will be a gain to Government to have men under its service with a better knowledge of their work than would otherwise be attainable. It has become a fashion to reproach the Indian student for not taking to the study of

science for the love of science, as if even in the most civilized countries which owe their civilization to science, the raw unfledged student prosecutes scientific studies with expectation of neither immediate nor prospective advantages. It is, as I have often said, a noteworthy though sad fact that earnest students are seldom found amongst those who are born and bred up in the lap of luxury and ease; all the world over, and specially in our own country, they are met with chiefly among the poor. It is the duty of every lover of true worth and of the State to find out genuine talent from its home in adversity.

And now, Honourable Sir and Gentlemen, I have done. I feel that in this great matter I have not been able to do my duty with any satisfaction to myself. Having had to satisfy the demands of the stomach by my professional work, I had not leisure enough left to devote to the adequate fulfilment of the task I had set before myself. I think I ought to admit that it is chiefly to this cause that the progress made by the Association in twenty years has been so small compared with what has been done in the West during that time as scarcely to lead to any hopeful prospect. If I am still persevering, it is because I have faith in the inherent capacity of my countrymen to explore the secrets of nature, it is because I have faith in the beneficence of our Government, and above all it is because I have faith in the providence of God.

My countrymen, you have but to will it, you have only to properly use your hoarded wealth and hoarded intelligence, and it will not be long before you take your place among the favored nations of the world.

Do you want any recent example to encourage you and inspire you with confidence? Look at Japan, only a few years ago perhaps the most insignificant country in Asia. And yet see what science has done for her. Why should you despair when you are backed by a most glorious past and can rely upon an inherited intelligence not inferior to any other in the whole world? How is it that the spirit of your sages does not animate you, sages who set before men the loftiest ideals of excellence, truth for the intellect and absolute disinterestedness for the heart? I leave you to ponder over these questions and to find what answer you can.

Speech at the 16th Annual Meeting, held May 29, 1893.

After the reading of the Report, Dr. Sircar addressed the meeting as follows:—

GENTLEMEN,—From the report that has been just read, it must be evident that the progress made by the Institution though slow has been steady, and such as to encourage the hope that, if the same influences are at work which caused it, and if other influences do not arise to oppose and counteract it, that progress will grow more and more.

Now in order to ensure the continuance and acceleration of the progress already attained, it is necessary to take a retrospective view of the causes,—the circumstances, influences, or agencies—by which it has been brought about. The first of these was the felt necessity for the cultivation of science by our countrymen, for without this the project of an Institution to afford facilities for such cultivation would never have been entertained. The second circumstance or agency was the necessary outcome of the first.

However some of its branches might be traced to a remote antiquity, just as the sources of majestic rivers might be traced to cloud-land, there can be no question whatever that physical science, properly so called, is of modern growth, if not absolutely of modern origin. And therefore, Gentlemen, I believe I am not committing any unpardonably unpatriotic sin when I say that physical science did not exist in our country even in days of its greatest glory,—of its loftiest intellectual achievements. And certainly it does not exist in the present day. It must be introduced from the West. The natives of India, if they want to take rank with the civilized nations of the world, if they must escape the ignominy of being morally and intellectually effaced from the face of the globe, must do what these nations are doing, must take to the cultivation of science which will elevate them from the position of slaves to the rank and dignity of masters of Nature.

Hence the cultivation of science must form an indispensable element of our national culture, as it is in all civilized countries. And there must be national support to this national work. This can only be secured by an organization which must be national in its character. It is with this view, Gentlemen, that I have striven all my life long to induce my countrymen, Hindu and Mahometan alike, and any other race or people who pride in the name of Indian, to unite in the holy bonds of fraternal sympathy and love for the common, worthy cause of mutual advancement by the at present best means, and I might say, the only means, within human reach, namely, the cultivation of the physical sciences.

I must gratefully acknowledge that my humble efforts have been most nobly, most liberally seconded. Indeed, I may go so far as to say that no project put forth by a native of India has met with such encouragement and support both moral and material from my countrymen and from Government as the one I deemed it my duty to lay before the Indian public nearly a quarter of a century ago.

It is to these circumstances that we owe the progress to which the report bears testimony. And it must be obvious that, in order that the progress may continue and not come to a standstill, these circumstances or causes must continue to operate. With your permission, to make myself clear, I will repeat that the necessity of science-cultivation by the Indian people must continue to be felt, and due encouragement and support must continue to be given, in order that the object aimed at may be attained.

After this enunciation of what is at best but a truism I wish I could rest and cease to take up any more of your time. But I am sorry, Gentlemen, I cannot. Duty compels me to draw your attention for a moment to the character and extent of the progress of which I have spoken.

There is much for congratulation, as I have already said, upon what has been done for and by the Association. The donations made to it have been generally very liberal, and in some cases truly princely and magnificent. In the beginning, when the Association could scarcely have shown a respectable face before the public, when it could scarcely have justified its very existence, Babu Kali Kissen Tagore came forward

with twenty-five thousand rupees for scientific instruments and apparatus alone, in addition to the five thousand he had already paid to the general and two thousand five hundred to the building fund. This enabled the lecturers to place before their audiences the latest discoveries of science, and the importance of the Institution rose so much in the estimation of the public that, when an appeal was made for funds for the construction of a suitable Lecture Hall at a cost of about thirty thousand rupees, it was promptly responded to, and there was no necessity to touch the capital fund. We have now a lecture hall which is an important acquisition to our city.

Soon after the completion of the Lecture Hall, we began to feel the absolute necessity of a suitable building for the valuable instruments already in our possession, and which, for want of accommodation, we had to huddle together in the lecture hall. We were at our wit's end as to what to do. We were afraid to touch our capital fund, and we were afraid to issue a fresh appeal to the public. But the necessity was so great that we at last resolved upon drawing partly upon our capital fund and partly upon the liberality of the public. At this juncture, and unsolicited, the Maharaja of Vizianagaram came forward and promised to bear half the cost, and shortly after, "sympathising with our necessity and difficulty, and seeing the importance of our undertaking not only to Bengal but to all India," with an unparalleled generosity, His Highness took upon himself the entire cost of the laboratory building. Thanks to this enlightened and princely munificence for which we owe a debt immense of the deepest gratitude

we have now a structure which is the largest building of its kind in the Metropolis, and which fully equipped will serve the purposes of an excellent physical and chemical laboratory for a long time to come.

Thus have two of its most urgent needs been supplied, a lecture hall and a laboratory building, without which the Association, with all the philanthropy and love of science of its lecturers, could not have begun its career and continued so long. But a lecture hall and a laboratory building, though so indispensable, are not all. There must be men to lecture and there must be proper instruments and appliances to lecture with. The life-blood of the laboratory must be constituted by these instruments and appliances, and the animating spirit by men competent to utilize them for the exploration of nature.

It is true that we have already a splendid set of instruments and appliances for which, as as we have already seen, we are indebted to Babu Kali Kissen Tagore. But it must be remembered that these are over a dozen years old. Not to speak of breakages and wear and tear which have reduced their number and their utility, we must remember what rapid strides have been made by science in her career of discovery and invention, and then we shall realize what new additions we must make to our laboratory simply to illustrate these new conquests of the human mind in the domain of nature. And any one familiar with the history of discoveries and inventions can easily understand what the cost must be for making these additions. Unless the Association is prepared to do this, unless in other words, it can keep pace with the pro-

gress elsewhere made, there would be no justification for its existence.

I have already told you that in the beginning, with Babu Kali Kissen Tagore's aid, we could lay before the public the latest discoveries, and that this fact contributed to enhance the reputation of the Association as a scientific institution. In order that that reputation may be maintained, we must have fresh aid for fresh outlay on improved and new instruments.

Again, it is true that the Association has hitherto been able to command honorary lecturers, two of whom have been giving their services gratuitously and ungrudgingly ever since its foundation, that is, for sixteen years, and will continue to do so, as long as it will please Providence to spare their strength. But it must not only be remembered that they are not immortal, but that we require men who shall be free from other occupations in order to be able to devote their undivided attention to special subjects.

The object, with which this Association was founded, is not simply the diffusion of a knowledge of the truths of science discovered elsewhere. This is but one of its objects, and a very inferior and subordinate one. The other, the higher, the primary object, is what was described in the very first paragraph of my sketch of the scheme of the Science Association, and which was adopted in the very first resolution founding the Association, viz., "to enable the Natives of India to cultivate Science in all its departments, with a view to its advancement by original research, and (as will necessarily follow) with a view to its varied applications to the arts and comforts of life."

Without entering into an analysis of all the requisites for original research I may simply observe that it means hard laborious work. It is essentially the close application of the mind to the study of phenomena which, as presented by nature, are interwoven with each other in the most complicated manner. The unravelling of this marvellous web is the object of original research for the purpose of discovering the relationships of phenomena, which in human language we call truths of nature. As one of the noblest undertakings of the human mind, it taxes to the uttermost all the senses, and most of its highest intellectual and moral faculties, such as the imagination and the judgment, and patience, perseverance and honesty. One essential requisite, without which the most brilliant intelligence will miserably fail, is continued application. The mind must be at its subject, not by fits and starts, as is the prevailing way of work in our country, but uninterruptedly, not for days and months only but for years, and then the reward may come of the discovery of some relationship of phenomena hitherto unknown, of some new truth.

It is thus that truths are revealed to the devotee of science, slowly and gradually. But singularly enough, this is what does not appear to those not actually engaged in research. On the contrary the truths of science, when demonstrated by a competent lecturer, appear to be so plain and simple that the impression is generally left on the mind of the audience that they were discovered easily and without effort, or with no more effort than is required to handle a few instruments. There cannot be a more delusive and a

more mischievous impression, which to my mind is a serious drawback of popular lectures, especially in this country where listless inactivity, *nirvana*, is looked upon as supreme bliss.

This is one of the reasons why progress has come to a standstill in this country, and this is the chief reason why the enthusiasm, that was displayed at the establishment of the Association, has so rapidly evaporated. People generally, and even most of its supporters, expected that, as soon as the Association will be established and lectures delivered, the attendance at these lectures will convert the audience into full-blown men of science, and discovery will follow upon discovery in quick succession as in Europe and America. Gentlemen, you must not think that I am drawing a caricature of the prevailing impression about science-cultivation of this country.

Had the impression been other than what I have described, the progress of this Association would have been a great deal more than it has been, and not unlikely some discovery might have been made. For the capacity of the Indian youth to master the truths of science has been subjected to practical tests, and found not only not wanting, but admitted by competent authorities to be apt and ample. The only defect or drawback is the ignorance of which I have been forced so bitterly to complain, an ignorance which has engendered an overweening confidence in our own powers, and which in its turn has given rise to the most lamentable inaction or inertia, in witness whereof I will instance the fate of our Ripon Professorship project.

Your Committee had to complain in the beginning

of the slow progress of this Fund, and for the last seven years it has been repeating its cry of absolutely no progress, and has not the cry been literally in the wilderness ? Had the necessity for professorships been understood, could the Ripon professorship fund have remained in *statu quo* at the sorry figure of nineteen thousand rupees ? Our modest estimate for a professorship is only a lac of rupees. Would it not be a libel on the wealth of this city to say that there are not at least half a dozen millionaires who can each found a professorship ? Are there not a thousand citizens who can each easily spare a thousand of Rupees, ten thousand each of whom can give away a hundred rupees without feeling the loss, and a hundred thousand to whom one to ten rupees would be nothing. If Calcutta would but mind it, not only the Ripon Professorship but at least a couple of other Professorships could be founded in one day. And if the whole of Bengal were to mind it, a dozen professorships would not be a large number to be founded in no time. What is it which prevents Calcutta and the country from being so minded ? I must leave it to you, Gentlemen, to find the reason and the remedy.

All honor to His Highness the Maharaja of Cooch Behar for helping us materially in founding a professorship. Inadequate as it has been, the stimulating effect of remuneration on workers is seen in our Cooch Behar lecturer, Babu Ram Chander Dutt. Ever since we have been able to give him some compensation for his loss of time, he has been giving us every year complete courses on chemistry, consisting of not less than 80 lectures and over a dozen practical demonstrations,

not inferior to any such courses provided for elsewhere. And here it gives me great pleasure to bring to your notice that from the humble position of an assistant to our lecturer on chemistry he has risen to the proud position of a competent and able lecturer himself, showing what I have been telling all along that the Indian mind requires but suitable opportunities to develop itself.

Gentlemen, it breaks my heart to see what fine and splendid intellects are being wasted and ruined for want of such opportunities. To speak of recent instances: A poor student, Shoshi Bhusan Mitter, of of Kidderpore, has just come back from England with a thorough training in and a most respectable knowledge of the biological sciences. He applied to the only Institution in Calcutta where he could get some suitable employment, but the authorities of that institution, having apparently no confidence in Indian experts, are loth to employ him, and he cannot find employment elsewhere. The result is, he is starving, and his knowledge and his talents are running to waste. Our own University has turned out a graduate who is a genius in mathematics, and whose mathematical acquirements have been acknowledged even in Europe. But he must earn his bread by other means than mathematics, and we have the sad spectacle of this brilliant genius wasting its energies within the granite walls of the High Court, and in uncongenial and unprofitable pursuits. And it is my belief, there are many others who are being similarly wasted. What a gain would it have been to the country if the genius and talents of these men would have been utilized;

and where better to utilize them than in an institution like ours ?

I see I must conclude, but I cannot do so without asking you to remember what Prof. Huxley, speaking on Technical Education at the Working Men's Club and Institute, said : "I weigh my words when I say that if the nation could purchase a potential Watt, or Davy, or Faraday at the cost of a hundred thousand pounds down, he would be dirt-cheap at the money ;" and also what Lord Ripon said at the Convocation of the Calcutta University at which he presided, "a single school founded, a single college aided, nay a single scholarship provided, will do in the times which are before us, to uphold the honor of an ancient name, or to create the reputation of a new one, more than any outward show of dignity, or any personal display of wealth." Verily, I tell you, Gentlemen, a single professorship founded in this Institution would redound to the glory of your country, and be a monument to your enlightened liberality more durable than brass or marble.

It gives me great pleasure to announce, and I doubt not it will give you equally great pleasure to learn, that Maharajkumar Binay Krishna Bahadur has subscribed Rs. 1000, and Babu Chandra Sekhar Kali, L.M.S., Rs. 500, in aid of the Ripon Professorship Fund.

Speech at the 15th Annual Meeting, held May 29, 1893.

After having read the Report, Dr. Sircar addressed the meeting as follows :—

Gentlemen,—I have to crave your indulgence for one moment before I sit down. In noticing the diminished attendance at the lectures of the past year the Committee have, I believe, rightly accounted for it by the fact that the Colleges of Calcutta, which furnish the bulk of our audience, have most of them begun to provide themselves with apparatus for the experimental teaching of science, the consequence being, that though the facilities offered by the Science Association for the experimental illustration of scientific facts and principles are much greater and fuller than are to be found elsewhere, still the majority of students, with a pardonable regard for convenience and economy of time, prefer the inadequate and imperfect facilities offered by their own institutions. When these facilities become more and more adequate and perfect, the audience from this source, now the chief source, will necessarily become less and less. In anticipation of this contingency which is sure to come one day, and in order that the Science Association may fulfil its objects better under the altered circumstances, the Committee have wisely suggested a deviation from the course hitherto pursued, namely, to institute two classes of lectures, one elementary for the instruction of the masses, and one advanced for the enlightenment of those who have already passed through the portals of the University, or any how have mastered the discovered facts of physical science.

The Committee, in making the suggestion, have told you at the same time, how impossible it is to carry out the suggestion with our present honorary lecturers. Indeed the suggestion can only be carried out by whole-time lecturers, or rather professors, whose sole business would be to devote undivided attention to their respective subjects. What the stimulus of remuneration, even when inadequate, can do will be evident when I tell you that the first part of the plan proposed by the Committee is being carried out by Babu Ram Chunder Dutt, who since the beginning of this year is delivering a course of free popular lectures on the advantages of Physical Science in Bengali. These lectures are highly interesting and are rendered very impressive by being illustrated with striking and suitable experiments. The attendance at these lectures is all that could be desired, numbering over two hundred, and being composed of men of all classes and capacities, who not only appreciate, but seem to enjoy the lectures. This fact demonstrates more eloquently than any amount of words the utility of science-teaching through the medium of the vernacular.

Gentlemen, I trust I am not startling you when I give it out to you as my conviction that in order to the successful indigenous cultivation of science, it is necessary not only that we should remunerate our teachers, but that we should offer rewards to the learners in order that they may prosecute scientific studies as yet not apparently profitable from a pecuniary point of view. This would be only to do what is being done all over the world for similar purposes. It is very easy to reproach the Indian student for not taking to

science for the love of science, as if even in the most civilized countries which owe their civilization to science the unfledged student prosecutes scientific studies with expectation of neither immediate nor prospective advantages. Of course *we* know that in the end scientific studies would be profitable to the student and to the country at large, but so long as this is not immediately so, we must allure students to these studies by reward in the shape of prizes, medals and scholarships. But there is another consideration which should induce us to offer these rewards. It is a notorious though sad fact that earnest students are seldom found amongst those who are born and bred up in the lap of luxury and ease ; all the world over, and specially in our own country, they are met with chiefly among the poor. It is only by proper help opportunely rendered that we can utilize genuine talent from its home in adversity.

These opinions, Gentlemen, are not what have taken possession of my mind recently. They are opinions which I have held for a long time, and I endeavoured to give effect to them at the very commencement of the establishment of the Science Association ; and we had accordingly both prizes, medals and scholarships. But our subscriptions for that purpose falling short, and our other needs being more urgent, we had to discontinue them. A recent offer to found a prize has induced me to solicit your permissison to revive them as we are again in a position to do so. This offer has come from a distinguished countryman of ours, no less a person than the worthy vice-chancellor of our University. The Hon'ble Justice Guroo Dass Banerjee has sent me G. C. notes of the value of Rs. 550 for

the purpose of founding a prize of Rs. 20 out of the interest thereof, to be awarded to a deserving student who attends the lectures of the Science Association, the prize being called the Jatindra Chandra Prize, after the lad whom Providence has been pleased to remove from the care of his earthly father. I have no doubt you will accept this offer with thanks to the bereaved donor.

I have permission also to tell you that we can found other prizes and scholarships too if we like. Raja Peary Mohan Mukerjea, as you know, is very generously continuing his late lamented father's subscription of Rs. 200 a year for prizes, and Rs. 300 a year as subscription to the general fund. The Raja has left us free to dispose of the whole of this yearly amount in any way we think proper, and I do not think we can do better than found prizes and scholarships in the name of the late Babu Joykissen Mukerjea who was one of its first patrons, and that of Raja Peary Mohan, who is one of its staunchest supporters.

Speech at the 14th Annual Meeting, held April 1891.

After the reading of the Report, DR. SIRCAR addressed the meeting as follows :—

YOUR HONOUR AND GENTLEMEN,—

The Report, which with your permission I have read, has been a rather tediously long one, and it would be cruel if I were to prolong the tedium by any idle words of mine. Before an audience like this, and indeed before any audience in the present day enjoying blessings which Science has made Nature scatter broad-cast over the world, any attempt to discourse

on the advantages of Science would be unjustifiable impertinence. And though in view of the progress, the very small progress, which this Institution has made in the course of upwards of fifteen years, during which time Science has made rapid strides in the favored countries of the West, giving birth to marvellous discoveries followed by equally marvellous inventions, all tending to the comforts and happiness of man, I say, though in view of this lamentable state of things in my own country, the temptation is great of reiterating what I have been saying for nearly a quarter of a century, about the absolute need of the physical sciences for the regeneration of the Indian races, I must resist that temptation.

The time has come when I may fairly assume that all this is fully understood, that the utility of this Institution is no longer a matter of doubt, and that all that is needful now is to find out ways and means to bring out that utility. The Association has already a good lecture-hall which will serve its purpose for some time to come; and will soon have, through the magnificent liberality of His Highness the Maharaja of Vizianagram, a splendid building for the Laboratory. But the building, to use the words of Clerk Maxwell, is but the outward shell of the Laboratory proper. The life-blood, I need hardly say, is constituted by instruments of illustration and research, and the animating spirit must be the men who will devote their lives in it to use those instruments for the exploration of Nature. Through the munificence of one of Bengal's noble sons the Association has hitherto been enjoying the advantage

of a good collection of scientific apparatus with which it is working up to this day. But when it is said that this collection is being worked for upwards of a dozen years, it will be easily understood in what state they must be now, and how needful it must be to replace and supplement them by newer and more modern instruments if the Association must keep pace with the progress of discovery.

This means the expenditure of a good sum of money, and the Association ought to be enabled to command it. It ls due to Babu Kali Kissen Tagore who has hitherto helped us so generously and that at a time when without his help we could not have commenced operations at all, that our millionaires who have not yet come forward in aid of the Association should follow his noble example, and that others whose means will not permit them to imitate him in the magnitude of his liberality will not deem it unworthy to come forward each according to his means. Nothing, in my humble opinion, is a greater mistake than to measure the value of a charitable contribution by its amount. And I am afraid it is this mistake which prevents the majority of my countrymen from taking that active part in all movements for the public good which but for it they would take, and it is thus that this fatal mistake deprives such movements in our country of their really public character.

But suppose we succeed, as I believe we shall, in having a well-equipped Laboratory, there will yet be wanting some thing, the most essential thing, to vitalize it, that is, actual workers to work it. How to get them is the most difficult problem in our country.

The time has not come when we may have faith in unremunerated workers. The men of leisure are not the men in any part of the world who contribute by their intellectual work towards the intellectual advancement of the race. The Counts du Moncel are solitary examples even in Europe. It is the poor student who must be furnished with leisure, that is with freedom from anxiety for the satisfaction of irresistible animal wants and cravings, in order that his mental energies may be conserved and utilized for the conquest and annexation of nature's domains in the service of man.

But this gain means the outlay of a large sum of money, much larger than is necessary for the equipment of the Laboratory. The Report has told you what the state of the funds is for the endowment of a professorship to be called after Lord Ripon. At the time the proposal for such a professorship was made it was hoped that considering the imperative necessity of a professorship and the dear and honored name with which it was intended to be associated, the citizens of Calcutta would not allow a long time to intervene between the proposal and the endowment; and indeed, to quote the words Sir Steuart Bayley used when presiding at our annual meeting in 1888, "if ever there was a project which deserved the enthusiastic reception of the people of this town it was one projected for their benefit by Lord Ripon, twice urged on their attention in public by him, subscribed to by him, and to be called after his name." In view of the project of the professorship falling through from want of funds, Sir Steuart was quite justified in reproachfully asking, "in this wealthy city is Lord Ripon's name then

forgotten?" and in leaving us to draw the moral. Sir, I must confess I have been the principal delinquent in this matter. I am afraid I have not been able, from a variety of causes which I need not here enumerate, to move about it with sufficient energy to acquaint my countrymen with the project itself to gain for it their support and aid. And I therefore hope with our Committee of Management that my countrymen will not allow it to remain a myth, but will now come forward the more readily to make amends for their past neglect and make it ere long a reality.

The Report has told you of His Highness the Maharaja of Cooch Behar's handsome monthly contribution towards the establishment of a permanent professorship, and also how the money, being as yet inadequate for the remuneration of a full-time professor, is proposed to be utilized for the present, till either the Association is in a position to add its own quota to it, or which is a greater probability, till the Maharaja may see fit to increase the amount of his contribution. At any rate there seems to be every prospect of this professorship soon passing beyond the nebular stage and settling down into a permanent endowment.

In this way by a gradual but a very slow process the Association may rise to the dignity of a scientific institution, fulfilling in a humble way the functions of diffusing and, may be, of making small additions to scientific knowledge. But it must be remembered that by the time it attains to this dignity, Science will not remain in *statu quo* in Europe and America, but will have advanced, and if that advance be, as it is

very likely to be, at its present accelerating rate, our poor institution will suffer immeasurably by comparison. To avert this catastrophe, for a catastrophe it will be in view of our glorious past and the promising present when the progress of enlightenment has become so rapid under the blessings of western education and the fostering care of a beneficent Government,—to avert such a catastrophe it must be the earnest endeavour of every patriot. And the only way, which I can think of, by which this may be effected, is to set free and properly direct the two forms of energy that are to be found in the country, partly latent and partly working or rather, to speak in more appropriate terms, being dissipated in wrong directions, I mean the energy of intellect and the energy of hoarded wealth. We have ample and satisfactory evidence of the existence of astonishing amounts of both forms of energy. To liberate and properly direct the former in order to get the maximum of work from it, it is absolutely necessary to liberate and properly direct the latter; and when this is done, when wealth becomes the help-meet of intelligence, the arrears due to a variety of causes will, I am confident, be made up, and the time hastened when India shall regain her lost prestige.

"My people are perishing for lack of knowledge," is literally applicable to the people of India. Ignorance of the eternal laws by which the universe is governed has brought death into this country, death physical, death intellectual, death moral. And is this ignorance to continue here when the rest of the world

is ablaze with the light of knowledge? The light of knowledge elsewhere, unless we can make it our own and add to it, will not avail us but will only render the darkness of our ignorance the more visible. It is to help in reluming the light of knowledge in the breasts of my countrymen in order to restore their old Aryan vigour of intellect, that this Association has been established, and that I have nearly sacrificed a whole life-time. I trust that I have not done so in vain, for I believe every one will admit with Shaik Saadi that—

بنی آدم از علم یابد کمال
نه از حشمت و جاه و مال منال
چو شمع ازپي علم باید گداخت
که بي علم نتوان خدارا شناخت

Which being interpreted means :—

The children of Adam through knowledge attain perfection,
Not through pomp or splendour, riches or possessions;
For the sake of knowledge you should consume yourself like a candle,
For without knowledge God cannot be known.

An Appeal in Aid of Funds for Professorships and a Laboratory (Prefixed to the Report of the 12th Annual Meeting, held 30th April, 1889).

I have ventured to preface the following (twelfth annual) Report of the Science Association with an appeal in aid of funds for the erection of a laboratory and for the endowment of professorships, in the hope that the appeal will not be a vain one.

The Association has been in existence for over a dozen years, and with the funds which it has been able to command it has done and is doing what could possibly be done. It has secured for itself a local habitation in perhaps the best situation in the town; it has built a lecture hall, the best in Calcutta; it has purchased scientific instruments and apparatus well adapted for experiments to illustrate ordinary lectures in physics and chemistry; every year it is placing within the reach of the public full courses in physics, in chemistry, and in the higher branches of pure and mixed mathematics, for a nominal fee.

So far the country may be congratulated in having established such an institution. But we must not confine our attention to the present. We must see if the Association has secured for itself a permanent basis, whether its funds are such as to enable it to keep pace with the progress of science, and to entertain a staff of teachers and lecturers who can devote themselves wholly and solely to the cultivation of their respective subjects.

In the first place, it is necessary to bring the fact prominently before the public that the Association is now performing but one of the humblest of its func-

tions, that of diffusing an elementary knowledge of science, by means of honorary lecturers, an agency which, for obvious reasons, can only be of a temporary character.

In the second place, we must place the sad and serious fact before the public that though it has built an excellent lecture-hall it has not yet a suitable building to locate the instruments and apparatus already in its possession, neither has it funds to build a proper laboratory. The old building, where these instruments and apparatus are kept, is in a tottering condition, and is absolutely unsafe as the depository of these valuable articles.

The two pressing needs of the Association are, therefore, (1) Permanent professorships, and (2) a suitable building for a laboratory where not only the instruments and apparatus and other materials may be safely and conveniently located, but actual research in physics and chemistry may be carried on.

A lac of rupees is the lowest estimate for the endowment of one professorship. The Committee of Management deemed it proper, in view of the substantial encouragement received from Lord Ripon, to name the first professorship after him, and the hope was entertained that subscriptions would come in for an object which served the double purpose of giving stability to the Association and of honoring the name of a Viceroy who had shown the largest sympathy towards the people of this country. Though upwards of four years have elapsed, that hope seems yet to be far from its fruition. But the Committee have not given up the hope. They believe that the country will awaken to

the importance of the Association, and will not permit it to languish and die from want of the necessary support.

In the meantime, I should beg leave to suggest that it would not be difficult to try the experiment of paid professorships by means of monthly subscriptions. Taking three hundred rupees as the salary of a professor, the monthly cost of two professors, one for physics and one for chemistry, would be only six hundred. The Association is already in receipt of the handsome annual subscriptions of two hundred and five hundred respectively from Maharaja Sir Jotendra Mohan Tagore Bahadur and Raja Peary Mohan Mookerjea. A few such liberal subscriptions will enable the Association to start the professorship, and I am confident that there are amongst members a large number to whom such subscriptions would be no burden at all. But in this matter I would not insist upon a particular amount of subscription. I would throw myself entirely upon the generosity of the members and the outside public, and would be thankful to receive any sum they may be pleased to regularly pay for a sufficient length of time (say five years) to fairly try the experiment.

I would solicit the attention of those who have not yet become members, to the following Rules for membership of the Association :

"Rule 7. Any Person, who shall hereafter pay a donation of not less than Rs. 500, shall be entitled to become a Life-Member, without election.

"Rule 9. Candidates for Ordinary Membership shall be proposed by one, seconded by another, Member at a Meeting of the Committee of Management, and elected by the vote of a majority of the Members present at the meeting. Such Ordinary Members shall have to pay,

in advance, each a subscription of Rs. 24 per annum, the commencement of effective membership being from the date of payment of the first year's subscription. The membership shall cease in default of payment of subscription within three months after notice.

"Rule 10. Both Ordinary and Life-Members shall have the right to attend all the meetings of the Association, to vote at such meetings, to be eligible to all its offices, and to attend any and all lectures delivered by lecturers appointed by the Association."

It will thus be seen that by the payment of the trifling sum of Rs. 24 a year, which means Rs. 2 a month, any one can become a member of the Association and thus directly and indirectly help in the cultivation of science in this country. Every hundred and fifty such members would enable the Committee to employ a whole time professor, which means a man who will be able to devote himself to the experimental study of a particular branch of science and deliver regular lectures in it to a class and to the public. Is it too much to expect that at least five hundred persons in the Metropolis, and five hundred more from the country generally, may, for such a purpose, the purpose of enabling the Science Association to have permanent professorships, become Ordinary members of the Association? One thousand ordinary members means two thousand rupees a month, and if properly and judiciously managed what a large amount of good work might not be done with it by the Association?

In the matter of the erection of a laboratory, which is even a more pressing present necessity than the endowment of professorships, it is easy to see that we must have a lump sum at once. Monthly subscriptions small or large, cannot possibly help. Any sum may be spent upon the building and equipment of a laboratory,—the fields of scientific research, and the

appliances and materials for research, are so numerous and extensive. But in view of the present state of science-cultivation in this country, and of the almost absolute hopelessness and impossibility of getting people to subscribe for an object which they have not begun to appreciate even partially, and especially in view of the other and numerous subscription-lists already before the public under higher patronage, I am bound for the present to be modest in my demands and expectations. But however modest I may be inclined to be, I feel that a less sum than a lac of rupees cannot be sufficient for the purpose.

Any one, who has any acquaintance with the cost of laboratories in Europe, will see that my estimate is the lowest imaginable consistent with usefulness. A quarter of a century ago the chemical laboratory of Bonn was erected at a cost of 20,009 *l.*, and that of Berlin at a cost of 32,000 *l.* The cost of the chemical laboratory attached to the Academy of Sciences, Munich, exclusive of the lecture room, was 30,900*l.* The total cost of the Chemical Institute attached to the Imperial University of Graz, completed in 1879, was upwards of 50,000 *l.* The Royal Technical High School of Stockholm has cost 25,000 *l.*, in buildings alone. The Royal Technical High School of Berlin has cost over 400,000 *l.* The new chemical laboratories of the Zurich Polytechnic School have been erected at a cost of 70,000 *l.* The Institutes of Chemistry and of Physics attached to the New University of Strasburg have cost, respectively 35,000 *l.*, and 29,150 *l.* The building of the Technical School of Finsbury, adapted to teach Physics, Chemistry,

Mechanics and Mathematics has cost 36,000 *l.* The new chemical laboratories attached to the University College, Liverpool, has cost 16,000 *l.* The estimated cost of the New Chemical Laboratory of the Cambridge University is 31,000 *l.* The cheapest built I can cite is the Oldham School of Science and Art, with physical and chemical laboratories, which has cost from 9000 *l.* to 10,000 *l.*, the entire expense having been defrayed by S. R. Platt, Esq., and his brothers.

I have enumerated but a few of the laboratories in Europe of which I have been able to find out the cost. But every country of Europe, even the humblest and smallest, abounds in laboratories, and yet the cry is for more and more. What a sad contrast does our country, with an area a little less than half, and a population about half, that of the whole of Europe, once the cradle of civilization, and the mother of literature, philosophy and science,—what a sad contrast, one is constrained to exclaim, does such a country now present in the matter of intellectual activity, notwithstanding that it has been enjoying the blessings of western education under a government the most liberal and the most enlightened on the face of the globe. Throughout the whole length and breadth of the country, there is not a single laboratory where research in any branch of science is being or may be carried on. The only institution of its kind in the country, established in the metropolis with the avowed object of cultivating and diffusing science, is languishing for want of the necessary funds to found professorships and build a laboratory.

Is this reproach to continue? Are there not brothers in our country, blessed with abundance, who can with ease emulate the brothers Platt and build a laboratory for the Science Association at a cost of a lac of rupees, which to many I know would not be a very large sum? Or, though not brothers of the same blood, may not a few of our wealthy men, as brothers of the same mind and heart and soul, unite for the common object of helping the cause of science, "which here in India," as Lord Lytton very justly said, "is really of all causes the most deserving, the most beneficent, and the most charitable." For to keep pace with the progress of the times we must cultivate science with the same earnestness and success as is being done in Europe and America, and in order so to cultivate science we must have a lavish expenditure of both intelligence and money. There is, thank God, no want of either in our country; all that is wanted is their proper application. The liberality of our millionaires is proverbial. They have only to be convinced of the goodness of a cause and they will patronize it unstintedly. Where we have the happy union of wealth and enlightenment and culture, as we have in a few honorable instances, there we have the best of results. We find men so favoured taking their proper places as leaders of the people, initiating and heading every movement calculated to ameliorate their condition. But these are solitary examples. And we naturally turn to men having the advantages of education alone to guide the nation. Alas! the experience of a whole life-time of anxious observation compels me to say that all is not sound here. Education has not yet had its full proper

effect upon us. The strange old belief in the possibility of achieving mighty things without adequate agency, by *mantra* (that is, by mere utterance of sounds) alone, is what appears to rule our minds still. We desire and aspire without deserving. This state of things must change, or we are doomed for ever. Unless our men of education appreciate at its proper worth the education they have received, unless they take to the study of nature in earnest with untiring patience, shaking off idleness and conceit which have all along been at the bottom of our ruin, our glorious past, our natural intelligence however acute, and our inherent capacity for development and progress however great, will not avail to avert the doom that must inevitably come upon us.

I have said that in view of subscription-lists before the public under higher patronage, I am obliged to be modest in my demands in behalf of the Science Association. At the same time I must urge that the object aimed at by the Association is, for the circumstances of the country, of a much more important character than that of any other institution, nay, I should go the length of saying, of all other institutions put together. It is, therefore, hoped that the public, while mindful of the needs of other charities, will not be unmindful of the needs of the only institution of its kind in India, calculated to lead the nation from the old channels of barren speculation to the new and fertilizing streams of Science—Positive, Practical Science—which, while it ministers to the convenience and comfort of the humblest individual, unfolds to her votaries the sublimest and the holiest, because the

truest, conceptions of the Universe and its Almighty Maker.

While I appeal to my countrymen for a cause which concerns them directly, that is, for their own lasting benefit which is no other than their regeneration, I appeal not less to English men of science in particular and to Englishmen in general, as to those from whose teaching and example I have learnt the value of Science as the most important factor in the education of man, to help us in our humble efforts to follow in their footsteps towards the attainment of the goal for which man is destined. And I trust that the appeal will fall upon appreciative and sympathetic ears.

The *Englishman* of 8th Instant understands "that there will be a considerable surplus left over after defraying all the expenses connected with the entertainment to the Prince," and remarks, "the disposal of this sum will be a matter of public interest." May I venture to hope that the public are, or at least ought to be, interested in the prosperity of an Institution for the Cultivation of Science in the Metropolis, and if so, could the surplus be devoted to better purposes than to the building of the laboratory which the institution so urgently needs, and which could then, with the Prince's gracious permission, be named after him to commemorate his auspicious visit to the Capital of the Empire?

The illustrious grandfather of our Royal Visitor, that model and marvel of a Prince-Philosopher, in his presidential speech at the meeting of the British Association for the advancement of Science at Aberdeen, expressed his satisfaction "that there should exist

bodies of men who will bring the well-considered and understood wants of Science before the public and the Government, who will even hand round the begging-box and expose themselves to refusals and rebuffs to which all beggars are liable, with the certainty besides, of being considered great bores." As a humble servant of the only body here I have taken upon myself to hand round the begging-box, but hope to meet with a different treatment from that depicted above. For I cannot think of a more appropriate memorial of the Prince's Visit than that I have suggested.

Catching the contagion of Europe, of England in particular, the country is resounding with the cry for Technical Education. I have not been deaf to this cry. I am watching it with intense interest. There is a general impression, that I am in favor of Theoretical Science, and that I look with disfavor on the practical applications of science. That this impression is the very reverse of fact will be evident from a reference to "A sketch of the Scheme of the Science Association" that I published in 1875, in the very first paragraph of which the object of the then projected Institution is set forth to be, "to enable the Natives of India to cultivate Science in all its departments, with a view to its advancement by original research, and (as it will necessarily follow) with a view to its varied applications to the arts and comforts of life." It was with this object that the Association was formally established by its Subscribers in meeting assembled under the presidency of the then Lieutenant Governor, Sir Richard Temple, who took a great interest in the institution and helped it to obtain the site in which it is located.

It will thus be seen that the Founders of the Association were not only not unmindful of technical education, but fully understanding its importance and its requirements, they wanted to place it on a solid and substantial footing, that is, on the basis of a preliminary scientific education. With the funds at its disposal the management of the Association has hitherto only been able to direct its attention to this preliminary scientific education, and from what has been said above it will have been apparent what further funds are still required to carry out even this part of its programme.

The funds required for carrying on technical education must be adequately large, or failure must be the result. With inadequate funds there may be a mere mockery and name of technical education, but not technical education properly so called. The humblest institution for imparting technical instruction even in a single subject of art or branch of industry must have a good collection of scientific instruments and apparatus and a laboratory for teaching the elementary principles of Science, that is, must have what the Science Association already has and what it still wants to have. Hence, in the present state of the country, to attempt to establish a separate and distinct institution for technical education would be, to say the least of it, un-economical. I therefore submit that, as the Science Association has for one of its objects the carrying on of Technical Education, any contribution to the Association, would in reality be a contribution to the cause of Technical Education,

Should the subscribers to the Reception Fund so wish it, the Association would be quite willing to keep

the amount made over to it as a separate Fund and employ it exclusively for purposes of technical education alone, and thus the nucleus of a Technical Institute as a branch of the Association would be formed. The Association, I need hardly remind my readers, was established as a memorial in honor of the visit to India of His Royal Highness the Prince of wales, and the Technical Branch thus formed would be a fit memorial of the visit of his son to the Capital of India. The details of the formation of the Technical Branch should be left to be settled by the Committee of Management of the Association in consultation with a Committee which may be appointed by the subscribers. A pretty considerable number of the subscribers to the Reception Fund are, I am glad to say, members of the Association and of its Committee of Management. It is therefore hoped that there will be no difficulty in arriving at a satisfactory arrangement.

13th January, 1890.

Speech at the 11th Annual Meeting, held April 1888.

After reading the above Report, the Honorary Secretary addressed the Meeting as follows :—

To this report I would, with Your Honor's permission, add a few words. The Association has been in existence a dozen years, and it may be a satisfaction to its founders and promoters to know that during that period of time a good deal of really good work has been done by it. A lac and forty thousand rupees have been realized as donation. About fifteen thousand Rupees have been realized as monthly subscriptions. The very commodious and excellently situated premises, in which it is located, have been made its own property at a cost of over thirty thousand rupees. A lecture hall, one of the finest and most commodious in Calcutta, has been built at a cost of about twenty-five thousand rupees. Besides this, about twenty-six thousand rupees have been spent in the purchase of scientific instruments and apparatus, upwards of twelve hundred rupees in books, upwards of two thousand rupees in furniture, about five thousand rupees to meet the lecture charges, and about twelve thousand rupees in establishment. In place of two lectures a month with which the institution commenced work, there are now at least three lectures a week, or twelve lectures a month, besides practical demonstrations. In place of a dozen or two people forming the attendance at the lectures, there are now over three hundred. Financially, the Association may be said to be in a prosperous condition for, after having spent a lac of rupees in the various items mentioned above, it has in Govern-

ment securities upwards of seventy-seven thousand rupees, besides a floating balance of over twelve thousand rupees. Surely this is good work and progress too. I do not deny that it is. But, Sir, as the projector of the Institution, and as one who considers it as his dearest life-object, I may be supposed to be deeply interested in its future. And it is because I am so interested that I feel constrained to express my discontent at the progress it has made, or rather, I should say, it has been enabled to make.

I am deeply grateful for the sympathy and support which the project of a Science Association received from my wealthy and enlightened countrymen, thanks to which the project has become, so far as we see it to-day, a reality. But I must be ungrateful to my country, I must be unmindful of her true interests, if I were not to repeat publicly before Your Honor and this distinguished assembly, what I have so often said, that the Science Association, as an accomplished fact, has not met with that sympathy and support from my countrymen at large which its importance as the most potent regenerating institution deserves. It would be late in the day to dilate upon the importance of the physical sciences. It may be said without exaggeration that a knowledge of them is the foundation of all material and moral progress. The civilization and the power of a nation are in exact proportion to the knowledge of the physical sciences which it possesses. Considering that that knowledge among the people of India is nil, absolutely nil, we need not an oracle from heaven to impress upon us the necessity and importance of the cultivation of these sciences by the natives

of India. So that it was not out of partiality to a pet project, but out of deep conviction of its absolute importance, that I have been urging my countrymen to help the Institution to fulfil the object with which it was established, namely, to enable the natives of India to cultivate science in all its departments, both with a view to its advancement by original research and to its varied applications to the arts and comforts of life.

Now, Sir, it is needless to repeat what I have again and again said, and what must be patent to any one at all conversant with these things, that towards the fulfilment of the function for which the Association has been established, the essential requisites are (1) the most improved scientific instruments and apparatus which illustrate and demonstrate the principles of the various branches of science, and (2) men who are in a position to devote themselves entirely to keeping pace with the progress of science generally and to carrying on research in some particular branch as a specialty. This admitted, we have before us the whole scheme of a Scientific Institute for this country where, we must remember, every thing has to be begun from the very beginning. We must have a good building which must not only contain our scientific instruments and apparatus, but must be so constructed as to be suitable for the carrying on of research in the various departments of science. We must have endowed professorships whereby we shall be able to secure men whose education and innate love of nature fit them for scientific investigators. And we must have one or more lecture halls where elementary lectures may be given to begin-

ners, where higher class lectures treating of the advanced and abstruse principles of science may be delivered before advanced students, and where the results of research conducted within the Institution may be laid before those who are capable of appreciating and profiting by them, and also before the public, in order to show what work is done and what progress is made by the Institution.

All this being admitted, what, Sir, is the conclusion to which it leads by logical necessity? What is *the* requisite that will secure the aforementioned requisites? That one thing needful in this hard world of ours, I do not know what it may be in other worlds, but in the world in which our lot is cast, that one thing needful is Money, the most wonderful of human inventions, because the parent of all invention, and the most potent transformer of energy. The promoters and patrons of the Association have a right to ask—Has not money been given, liberally given, towards the foundation of the Association? I must admit, and admit with all the gratefulness my heart is capable of, that the contributions towards the establishment of the Association have been very liberal, indeed, in some cases magnificent, one gentleman alone Babu Kalikissen Tagore, unknown to fame and Government, though well known to the poor and the needy and the deserving, having given a third of a lac of rupees. I must admit that no scheme launched by a native of this country has met with so much confidence and patronage as the Science Association has done. But, Sir, perverse as it may appear, it is because of the favor and the patronage already received, that I complain that the patro-

nage has not been adequate for the end sought to be accomplished.

To those who are familiar with these things, who intimately know how they are ordinarily managed and how they have been managed here, it will be obvious that what the Committee of Management have accomplished, with only a lac and fifty-five thousand rupees in hand, is almost a marvel. As I have already given you an idea of what has been done, I need not recapitulate. But though it is possible to do things, which may be looked upon as really marvellous, by dint of the strictest economy, and by driving as hard a bargain as possible for a good cause, it is not possible to actually work miracles. We have purchased instruments and apparatus as much as we could possibly get for twenty-six thousand rupees. But it must be evident, that they are but as a drop in the ocean that we actually require for the purpose we have in view. We have secured some of the ablest men to give their gratuitous services to us as lecturers, and who, for love of science and from the purest philanthropy, may continue to give those services life-long. But they are not all that we require, and we cannot make them immortal. Besides, it is not from these men, who have to work for us in the midst of their own most imperative and arduous and harassing duties, that we can expect the full amount of work in fulfilment of the objects of the Association.

It will thus be seen that though for a beginning much has been done, indeed all that could be done with the means at command has been done, for the permanency of the Institution nothing has been done. We require

funds to endow professorships, each of which will require about a lac and half. We want funds for additional instruments and apparatus and books, which, with a building to locate them, will require at least a lac of rupees. And we require funds out of the interest of which our collection of books and instruments must be added to from time to time, in order to enable our professors to keep pace with the progress of science.

These funds must be provided in order that the Association may become a permanent institution of the land, fulfilling functions of the most noble and elevating character, being no less than remodelling the Asiatic mind, leading it from the airy region of vain and mystifying speculation to the solid ground of nature's facts and laws. Thus become permanent, the Association will, I have no doubt, contribute materially to the advancement of science, and thus remain for ages the most glorious monument of British rule, and rear its head in all time as the most acceptable temple which man can raise in honor of the Creator. But where are the funds to come from ? Your Honor must have observed, that it has been my endeavour all along to make the Institution purely and entirely a national one. I have endeavoured to educate my countrymen in self-reliance and self-government in a matter in which they can display the utmost freedom, not only without interference from any body, but with the fullest and sincerest sympathy and encouragment from every body, especially from our beneficent Government. I trust and hope that I have not been wrong and mistaken in the policy I have been pursuing. This may have been the cause of the tardiness of its growth, but I believe

that the ultimate success of my scheme, the very life of it indeed, will depend upon the fact of its being a national movement. I therefore expect and wish that funds should come from my countrymen. They have been, as I have admitted, very liberal in this matter, much more, indeed, than an obscure practitioner of medicine could have ventured to expect. But remembering the importance of the cause, remembering their duties and responsibilties as men of education and enlightenment and wealth, they ought to be more liberal still, and what is perhaps of greater moment they ought not to remain satisfied after paying down their donations, they ought to identify themselves with the cause and exert their own influence in its behalf, and not leave it in the hands of a single individual, oppressed with many cares and anxieties and distracted by a most exacting and harassing profession.

I ought to mention that though I have not sought aid from our European brethren, we have had to thankfully accept such aid unsought from that quarter. And thus we have the names of four munificent donors adorning the list of subscribers to our funds. We shall very gratefully accept, indeed, it would be foolish not to accept, aid towards the furtherance of our noble cause from any one and from any quarter, provided such aid is given to us unhampered with conditions which we cannot fulfil.

It is but natural, Sir, that my voice, though raised in appeal for my country's best and truest interests, should have become monotonous in the ears of my countrymen. It has certainly become hoarse. I, therefore, require at this juncture, which is a very

critical one, for now the question is, not whether a science association should be started, but whether the Science Association that already exists should continue to exist,—I require at this juncture the aid of a more potent and persuasive voice for further appeal to my countrymen at large to come forward in its aid, not in units, as has hitherto been the case, but in hundreds and thousands, yea, *en masse*, and thus decide the question in a most emphatic affirmative. Sir, I cannot look to any other individual, who can lend me that more potent voice that I want, than to Your Honor, to whom, at this moment, my countrymen have very rightly turned their eyes for sympathy and encouragement, and for the realization of their just and legitimate aspirations.

A word about the subject of technical education, the most absorbing topic of the present day not only here in India, but throughout the civilized world, and I have done. Those, who have carefully considered the avowed object with which this Association was established, must have seen that not only purely scientific but technical education was embraced in its wide scope. The management of the Association has not hitherto been able to direct attention to the latter for the simple reason that preliminary scientific education must precede technical education, and that before making provision to establish the former on a secure basis, it would be madness to waste energy and fritter away funds for the mere name of technical education. We have the authority of the most earnest advocates of technical education that "Science must be the sole foundation of skill ; above the skilled doers, we must

have the skilled thinkers." The conclusion, to which the recent Royal Commission on Technical Education have come, is, that "if the instruction (in technical schools) is to be really useful, it must be made as thorough and scientific as possible. The indifferent technical school will soon be found out, despised, and deserted." If this is likely to be the case in England, what must it be here in India? The fact is, scientific education must permeate the country, before technical education would be even possible. I do not say, that it is altogether beyond the range of possibility that the two may not be made to go side by side, or rather, that technical education may not be made to follow closely upon the heels of scientific education. But before thinking of realizing this possibility, consider the amount of money that would be necessary to bring about the desired result. Archimedes could move the Earth if he had a lever of sufficient length. The Committee of Management of the Science Association would, I believe, be able to make thorough scientific and thorough technical education a reality even in this country, if sufficient funds were placed at their disposal. But without such funds, even if all the polytechniques of Europe were transplanted bodily to this country, they would die as exotics, and the people would remain where they were, in as deep darkness and ignorance as before.

Speech of His Honor, the President, at the same meeting.

His Honor the Lieut.-Governor (Sir Steuart Bayley) then addressed the meeting as follows:—Gentlemen, —After the eloquent address to which you have

just listened, and with which I should in vain endeavour to compete, it is not much that I can add. I was glad to be able to preside at to-day's meeting, because I feel it my duty and my privilege to encourage in every way the noble efforts of my friend, Dr. Mahendra Lal Sircar, to maintain what he justly calls the "most potent regenerating institution" in this country. I will explain hereafter why I consider him justified in applying such strong language to this institution.

I find the institution on its present footing was started in 1876. In 1882 the foundation-stone of your lecture hall was laid by Lord Ripon, and the building was inaugurated by the same well-wisher of your cause in 1884. On that occasion Dr. Mahendra Lal Sircar, using the same forcible expression, said your institution had not met with the sympathy and support it deserves. There had been more zeal and enthusiasm displayed for its establishment than could be elicited for its permanency and maintenance; and, now, again he complains of the want of funds, and asks me to assist him in his fresh appeal to the public. Well, the first question that arises is, what work is the institution doing? That question, I think, is sufficiently answered in the report which shows the number of lectures delivered on various branches of science by the most capable men in the country to an audience that has risen to some 300 in number. That the money hitherto spent has been well laid out, the lecture hall, premises, and the collection of scientific instruments and appliances are a sufficient testimony, and yet I cannot doubt that my friend's complaint is absolutely just and well founded. The three great wants are: (1)

A more complete set of instruments and appliances. These can only be collected gradually and systematically by devoting an annual sum to that purpose. (2) A laboratory which will be at least safe, which the present one can scarcely be considered to be, and a fitting place for the preservation and use by students of those instruments which you have. (3) The endowment of permanent professorships. Now these wants were prominently brought before the public at least four years ago. The building fund has crept up by slow degrees to Rs. 12,000 and there it stops. About the endowment of a permanent professorship, I have something more to say. Hitherto your lectures have depended on the good will of the eminent men who have, from pure love of science and of their fellowmen, devoted their time and labour to giving these lectures gratuitously. Too much praise and recognition cannot possibly be given to these self-denying labourers in a noble cause. I hail them as the true benefactors of the people of this country, and as the pioneers of a work of infinitely greater importance than is generally recognised or understood. But, as my friend has pointed out, they are not immortal, and this gratuitous assistance cannot always be depended on. In one way it is a positive drawback, as it tends to promote dependence on others, rather than on yourselves. Well, the remedy was pointed out by Lord Ripon, who first urged the establishment of paid and permanent professors when he laid the foundation-stone of your lecture hall in 1882. In 1884 he returned to the charge when opening the building, and, urging the work as one of primary necessity, offered a contribution

of Rs. 1,000, and it was then determined to establish a permanent professorship to be called after his name.

It might have been thought that a project started under such auspices would not have been suffered to die of inanition. If ever there was a project which deserved the enthusiastic reception of the people of this town it was one projected for their benefit by Lord Ripon, twice urged on their attention in public by him, subscribed to by him, and to be called after his name. To a certain extent his call succeeded—a sum of over Rs. 13,000 was subscribed the first year, Rs. 5,000 more was added the second year, Rs. 1,500 more the third year, and last year nothing. There the thing stopped, and the project is still where it was—likely to be still-born for want of funds. In this wealthy city is Lord Ripon's name then forgotten? But I would rather leave you to draw the moral, and content myself with reminding you of what Lord Ripon himself said, that "a single school founded, a single college aided, nay, a single scholarship provided, will do, in the times which are before us, more to uphold tne honour of an ancient name or to create the reputation of a new one, than any outward show of dignity of any personal display of wealth."

And now I will say a few words to explain why I attach such supreme importance to some scientific training, and especially in the case of the educated youth of Bengal. I might dwell on its practical utility as the indispensible handmaid, in one or other of its branches, of all manufactures, of many arts and many professions. I might prove to you how poorly equipped the engineer is for his profession without some

more complete knowledge of physics, of geology, of metals, and of the higher mathematics than his college curriculum affords. Still more forcibly might I apply this to the medical man. I might easily convince you how dependent the manufacturer is for the progress and superiority which achieve wealth, on the chemical processes which the man of science works out in the laboratory, and might point to the examples of the Watts, the Wedgwoods, the Bessemers, and countless others of the industrial leaders of modern times. Or leaving on one side the material gain involved in the pursuit of science, I might dwell on the beauty and interest which a knowledge of science adds to life. It makes all the difference between "eyes and no eyes." Those who have trained themselves to observe nature scientifically, get incalculable delight and joy from the every day things they observe, which are to others absolutely devoid of meaning and interest. To use an illustration of Professor Huxley's. The uninstructed person passes through life as through a gallery filled with wonderful works of art, nine-tenths of which have their faces turned to the wall. Teach him something of natural history, and you place in his hands a catalogue of those which are most worth turning round. Surely our innocent pleasures in this life are not so abundant that we can afford to despise the source of any addition to their number.

But it is neither to the practical utility of science, nor to its moral and æsthetic interest, that I wish now to draw attention. It is to its infinite value as a method of disciplining the mind and equipping it for the discernment and assimilation of truth that in this place I most wish to insist.

The school education of Bengal may be said to be entirely, and the college education far too largely, a purely literary education, and the result is a tendency to deal with words and expressions rather than to grapple with and examine facts. The following extract, from Professor Huxley's Lay Sermons, is intended to describe the mental attitude of the average English student, but I would ask you here if it is not still more applicable to those of this country.

"The young man has no notion of what it is to come into contact with nature or to lay his mind alongside of a physical fact, and try to conquer it in the way our great naval hero told his captains to master their enemies. His whole mind has been given to books, and I am hardly exaggerating if I say they are more real to him than nature. He imagines that all knowledge can be got out of books, and rests upon the authority of some master or other, nor does he entertain any misgiving that the method of learning which leads him to proficiency in the rules of grammar will not suffice to lead him to a mastery of the laws of nature."

Now the great value of scientific training is that it enforces accurate observation and encourages the testing by reason and experiment of every belief submitted to the mind. It brings the mind directly into contact with facts, and compels it to make sure, first, that these are accurately ascertained, and then to draw its conclusions from them, testing these again by experiment. By this means only can the best development of the reason with which we have been gifted be obtained, and it is because this hard and accurate question-

ing, which I believe to be the best corrective for the exclusively literary training of our educational system, is offered under the most favorable circumstances here to students and ex-students that I echo Dr. Mahendra Lal Sircar's strongly expressed belief that we have here a most potent regenerating institution, and as such, I trust it may flourish through long ages and hand down to posterity the name of its principal Founder and Secretary (Applause).

Speech at the 25th Annual Meeting, held Sept. 4, 1902.

After the reading of the Report Dr. Sircar addressed the meeting as follows :

REV. FATHER AND GENTLEMEN,—

Believing that this Annual Meeting of our Association is in all probability the last which will be held in my life-time, I have made a supreme effort to overcome my physical weakness in order that I may have the pleasure of meeting you this evening. But this pleasure of meeting you this evening is not unalloyed. It is mingled with intense sadness. It was my intention to unload my heart before you, but I have not strength enough to express all that I feel at the present moment. I can only give expression to one feeling that has taken overpowering possession of me, and that is a feeling of regret, regret at having wasted a life. I have failed in fulfilling a task which I had imposed upon myself, and for which I had solicited your co-operation. Co-operation I have had, co-operation unexpectedly splendid and liberal, but co-operation of a few only, of scarcely over a hundred out of hundreds of thousands of my

educated countrymen, out of sixty millions of Bengal, and if you like, out of 300 millions of India, for it was my ambition to make the project entirely national, embracing the whole continent with its diverse races and peoples.

The co-operation that you have accorded me has not enabled me to endow a single professorship, though three have been started in succession,—one in the name of Lord Ripon for whom all Indians showed such enthusiasm, one in the name of David Hare, the father of education in Bengal and to whom we Bengalis still show our gratitude by holding anniversaries of his death, and lastly one in the name of no less a personage than the late Queen-Empress Victoria whom we all heartly venerate as mother and sovereign. In my simplicity I thought this last professorship will be the first we will succeed in founding, and that other professorships will follow as a natural consequence. But beyond the two thousand subscribed by Drs. Gooroo Dass Benerjea and Asutosh Mukerjea at the last annual meeting when it was proposed, not a single pice has been subscribed in its aid. I do not know how to account for this apathy of our people towards the cultivation of science. And therefore I am forced to confess that I made a mistake in starting the project of founding a Science Association at all, and that I have wasted a life, as I have told you, in attempting to make it a national institution. If I had vigorously applied myself to the practice of my profession, though homœopathic, I am sure I could have left as a legacy an amount of money equal to that I have succeeded in collecting in over thirty years. But the institution

thus founded after my death would not have been of a national character, and would have been a belated institution.

It was a strong conviction that urged me to undertake this task of establishing a national institution for science, gigantic and ambitious as it is, but the fulfilment of which I considered it a duty of one and all who have the privilege of being born in the classic and sacred soil of India. The conviction is, and it is growing stronger every day of my life,—the conviction, Gentlemen, is no other than this—That circumstanced as our country is, with a past which for its intellectual achievements and spiritual developments placed her at the head of the countries of the world in those days and made her their instructress, and with a present having no respite from the invasions and oppressions of physical force—the distinguishing characteristic of the modern age—the only salvation of our country so circumstanced, not to speak of her winning back her lost prestige and taking a place among the civilized countries of the world—her only salvation, Gentlemen, lies in our accepting things as they are, and in moving with the spirit of the age in which our lot has been cast. In other words, we must betake ourselves to the culture which has made modern times what they are, and the basis of that culture is pre-eminently the cultivation and advancement of the physical sciences.

Let me assure you, Gentlemen, it is not mere policy to any how preserve appearances and save our country which has forced this conviction upon me. It is a sincere faith in the capability of the physical

sciences to act as the firm and solid basis of the development and regeneration of man's moral and spiritual nature which has prompted me to make the appeal to my countrymen that I have made to cultivate these sciences as they are being cultivated in the West. If I had believed that matter was all, and there was no mind behind it, that our present conscious existence was to be its last, that the universe has been, is, and will be a fleeting show in which all rational creatures play only transitory parts,—in other words, that the Cosmos is but an appearance and no more than a huge delusion, I would have acted otherwise than I have done. I would have taken care to spend my time happily in eating and drinking and being merry for to-morrow we die. I would certainly not have appeared before you now as I feel that the to-morrow here spoken of is for me as certain as to-day.

No, Gentlemen, my belief is, as I have told you often, that what we call matter is but the manifestation of Mind, of the Supreme mind. I do not identify this matter with the Supreme mind. What I believe is that it is a creation of the Supreme Mind with the impress of His image upon it, and therefore capable of development from lower to higher after fixed and eternal laws. I therefore cannot persuade myself to believe, as the greatest thinker of England and I may say of the world at the present day, would have us believe, that consciousness being according to him "a specialized and individualized form of that Infinite and Eternal Energy which transcends both our knowledge and our imagination, at death its elements lapse into

the Infinite and Eternal Energy whence they were derived." The beauty of this pronouncement is that he himself admits that this is "a strange and repugnant conclusion." Strange, it did not occur to Mr. Herbert Spencer that the Infinite and Eternal Energy which could produce consciousness of such exalted character as manifested in the greatest and noblest human beings, could not avoid the absurdity of extinguishing it for ever, and of thus creating a lie at every step of specialization and individualization. It is consciousness which inspires the conscious being with a sense of personal identity, and to merge all consciousness in itself (that is, in the Infinite and Eternal Energy) is to destroy all sense of personal identity which it was its privilege to bestow.

Such being the case the inquiry into the laws of so called matter is but an inquiry into the thoughts of the Eternal Mind, and as such cannot but be profitable to all finite beings. And so it has been, so it is, and so it will be, as long as these beings are linked with matter in such intimate relationship that the manifestations and workings of the mind can only take place through a material organization. To despise matter and to neglect the study of its laws is to despise ourselves and to neglect our own interests. This has pre-eminently been the case with ourselves, as also with the other Asiatic nations; and we are reaping the fruits of that neglect. One Asiatic nation, who were immeasurably our inferior in ages past when we were in days of our glory, having understood the spirit of the age, have acted accordingly, and have thereby acquired a co-ordinate position with the foremost na-

tions of the world, and are now the honored allies of the greatest of them all, under whose rule Providence has placed our destiny not without a beneficent design.

As I have told you often and often that we are enjoying under the rule of this nation more liberty, more freedom of thought and action, than we ever enjoyed under our own. But alas! that I should live to see that liberty ominously being threatened in a matter which has been the greatest blessing under British rule, which we have learned to prize as our highest privilege, and which our forefathers looked upon as the summum bonum, indeed the very end and aim, of existence. You are by this time familiar with the recommendations of the Universities Commission through the newspapers, for strange as it may seem the Report has not yet been published. Even the Universities concerned have not got copies of it. This is economy of paper and printer's ink with a vengeance. I am glad to notice that my countrymen have already fully appreciated the drift of those recommendations and have been naturally alarmed. Without imputing any motives to any body I cannot but observe, and it breaks my heart to do so, that the recommendations of the Commission seem to me to strike at the root of general education, and to discourage the study of science. I have often looked upon Pope's celebrated line as expressive of cant of the worst description, whatever might have been the poet's intention. People who are never tired of quoting it, forget that in order to attain to great learning we must pass through stages of little learning, and that sometimes for a variety of reasons we have to stop at some of these stages.

Even what we call great learning is but little learning compared to the vast unknown that must for ever remain to be learnt, and that being so we must, on Pope's principle, deprecate all learning.

Gentlemen, I must confess I never expected that the great men who formed the Commission should have virtually allowed themselves to be guided by that cant. It is not my intention to pass in review all their objectionable recommendations. Fortunately that has been done very ably by our distinguished countryman, whom we happily have as our honored vice-president, Dr. Gooroo Dass Banerjea. I can only touch on a few points. In recommending the fixing of a minimum rate of fees for our colleges on the grounds that "fees must not be fixed so low as to tempt a poor student of but ordinary ability to follow a University course which it is not to his real interest to undertake," that "the work of collegiate education has been much impeded by the attendance at colleges of students whose abilities do not qualify them for University education," and that "if a minimum rate of fees is not enforced, the standard of education and discipline is lowered," the Commission have displayed a horror of little learning and a sad want of knowledge of human nature. That they themselves felt the untenability of their recommendation is shown by their immediately adding that "no poor but really able student should be excluded, by reason of his poverty, from the advantages of the highest education, but these should be secured for him not by charging nominal fees or by the indiscriminate bestowal of free studentship, or the establishment of free colleges, but by a comprehensive

and liberal system of scholarships, provided by the State open to general competition as the result of University examinations." How these scholarships can be availed of by the poor student who are not allowed to enter the University it is not easy to understand. Even if the Matriculation examinations were a sure test of ability, which they are not, no system of scholarships could be made liberal and comprehensive enough by any State or Government, certainly not by the Government of India, to catch all the able and poor students of the country. Just fancy what Mr. Carnegie will think of this recommendation.

The system of scholarships recommended would end in a huge mockery, and the result would be to shut out able and poor students from the portals of the Universities, that is, from the advantages of high education. Besides, as I have hinted, the Matriculation examinations, and indeed examinations as a rule, are not infallible tests of merit at all. Many a student, who had stood lowest in the list at a first examination, has in subsequent examinations shown brilliant ability. In my humble opinion to raise fees in our colleges would be to offer a premium to wealthy mediocrity, and to place at a discount real ability. For, the habitat of genius, a rare product, one in a million according to Galton, is more the hut and the street than the palace. This contempt of poverty, I am bound to say, was not expected from the highly educated and enlightened gentlemen who formed the Commission.

The recommendations of the Commission for the abolition of the second-grade colleges, that is, colleges which teach up to the F. A. standard only, and for the

limitation of the B.A. to the literary course only, will inevitably have the effect of narrowing the field of general education and of setting an obstacle to scientific education. If these recommendations are carried out, most of the existing colleges will have to be closed. And will not this be disastrous to the cause of education? No one regrets more than I do the inadequate equipment of our colleges generally for the teaching of science, but that some of them do teach well up to the B-course of the B.A. degree is shown by the result of the examinations. I do not think that this result is altogether due to cram and to memory, and not to intelligent understanding of the subjects. I believe a good deal of real scientific knowledge is imparted by the institutions, and grasped by the students. And these institutions therefore should not be deprived of the opportunity of imparting that amount of knowledge which is calculated to create a taste for science and to be otherwise useful in the affairs of life. We cannot expect, in this transition stage of education in this country, to have fully equipped institutions for the teaching of science, and we must endeavour to foster and not destroy those already existing however inadequately equipped. The University examinations should be so regulated as to awaken them to their sense of responsibility in this matter so as to compel them to have well-furnished laboratories. I do not think it is possible to have ideally equipped scientific colleges any where in the world. We must utilize the materials at hand in the best way we can and not aim at ideal impossibilities.

I am almost sure that the noble Lord at the helm

of affairs of this vast dependency, with his broad sympathies and his high statesmanship, will not accept the recommendations of the Commission in their entirety, so far of them at least as affect the growth of general and scientific education. If gentlemen, these recommendations are accepted by the Viceroy, then you see that there will be but one institution in Calcutta, with the exception of the Presidency College and St. Xavier's College which will be capable of training students in two or at the most in three branches of science, Physics, Chemistry, and Biology, and that is this Science Association of yours. Now just realize what your responsibility in the matter becomes. The country has arrived at a stage when self-reliance for one and all has become a paramount duty. I have been preaching this duty for a third of a century with scarcely any success. It is now imposed upon you with all the weight of an impending calamity, and you ought to see if you are not capable of rousing yourselves from the torpor that had hitherto possessed you. The rude shock the Universities Commission have given you ought to rouse you from that torpor. The question now is one of money and of a firm resolve to use it properly. There is yet money in the country and you ought not to let the opportunity slip of making the best and noblest use of it in endowing educational institutions as is being done in Europe and America. In ages past the East set an example to the West. In the revolution of time it is now the turn of the East to follow the example of the West. But you must spend money with an unstinted hand. You must not squander whatever wealth you

possess in idle amusements and show your spending power for emply titles. You must prove your enlightened liberality for the amelioration and elevation of your country.

You must see that this Science Association has not only the three professorships already started but as many as there are branches of science to cultivate. You must see that all your educational institutions throughout Bengal which have sprung up from private enterprise are as well equipped as Government colleges for the University degrees. When you do this, you will be truly fit to take your own education under your own control, and Government will perforce recognize your institutions and respect you for your enlightened liberality. Pardon me if I tell you, then but not till then. Is there money enough for the purpose? I say there is. There is, I fully believe, potential energy enough in the shape of hoarded wealth. It has only to be set free for this purpose to be transformed into kinetic energy of the highest kind because intellectual and moral, to raise your country from its present degraded position to the high level of the highest intellectual nation on earth. The possessors of this wealth have only to be awakened to their true interests and the thing will be done. But others than possessors of hoarded wealth have a duty to perform. The middle classes are the real back bone of Society, and they ought to show that they have back bones themselves. It is their units which go to form hoarded wealth, and they ought to set apart a portion of their earnings, however small, as a contribution towards the betterment of their country. If the whole population

were of this mind or could be persuaded to be of this mind, a crore of rupees would be a small sum to collect in a short time. And who are to blame if we find the people not so educated! I must leave you to answer the question. I dare not incur the odium of answering it myself.

OPINIONS OF THE PRESS ON THE SPEECH OF DR. SIRCAR AT THE 25TH ANNUAL MEETING,

held Sept. 4, 1902.

(*New India*, Sept. 11, 1902.)

The devout prayers of the entire educated community in India will surely go up to the Throne of the Most High for the failure of the pathetic prediction, regarding his own self, with which Dr. Mahendra Lal Sircar opened his last annual address, before the Science Association, last week. Though with advancing years and failing health, Dr. Sircar may not be now as active as he was before, still his very presence among us is a strength and an inspiration, which we cannot afford to lose, and we trust and pray that he may be spared to his poor country for many years still to come.

Dr. Sircar is not only a man of science, but also a man of faith; and although doubts and despair come to the most faithful among us, in moments of great nervous depression, these cannot be the normal condition of their being. It is the function of faith always to triumph over failures, and reap life's richest harvests from its apparent ill-successes and mischances. So though Dr. Sircar has reason to complain of the apathy of his countrymen, he cannot say that his own life has, in any way, been wasted, unless by waste he means the natural disparity that eternally exists, in this world, between the ideal and the real, proving at once the infinity of God and the essential divinity of the human mind.

The Science Association has been Dr. Sircar's life-work; and the Science Association itself has not been a complete failure. The splendid building, the well-equipped laboratory, all bear testimony to the energy of its founder. But we cannot ignore the sad truth that while on the one hand, the Science Association stands as a memorial of Dr. Sircar's energy, of his love of knowledge and his profound love for his own country and his own people, it is a disgraceful commentary on our national character on the other. As long as Viceroys and Lieutenant-Governors openly supported this movement, money came in from all quarters to its funds, but with the practical withdrawal of official patronage the purse-stings of the wealthy public tightened at once, which, not even the magic of Queen Victoria's name, could re-open. Oh, the sickening unreality of public life and patriotism in this country, and the utter hollowness of our officially-worked up loyalty!

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But if the authorities will not help it, and if the rich people will not

support it, it becomes the duty of the educated middle classes to come to the rescue of this noble and useful institution. The authorities of the Science Association have themselves realised this, that ultimately they will have to fall back upon the public spirit and the patriotism of the upper middle classes of the country for the working out of their scheme. They have, therefore, reduced the subscription to the membership of the Association to rupees two a month. This has made it possible now for the educated middle classes to enroll themselves as members of this useful institution in larger members than before, and help it with their energy, their money and their counsel.

It is impossible to tell how far the Government Colleges and an officialised University will allow our people opportunities for original scientific work. The college laboratories cannot be open to independent workers ; they will be available for such elementary work only as students may undertake. It is by a mere chance that we have had two of our own countrymen in charge of the richly-equipped laboratories of the Presidency College in Calcutta. We are not sure that others will be given the opportunities that Dr. J. C. Bose or Dr. P. C. Roy has had, for carrying on original researches. The exigencies of the service to which they belong may at any time deprive them of these opportunities. Indeed, if we are not very much misinformed, Dr. P. C. Roy has been retained in the Presidency College at considerable inconvenience to the Department over which Mr. Pedler presides. It is inconvenient to Dr. Roy himself, who, we think, has to make considerable sacrifices to continue his work in the Presidency College. This anomaly cannot last long ; and we do not believe that the Government laboratories will be open in the future to our own countrymen, willing to carry on original research. On the maintenance and further equipment of the Science Association, therefore, will depend, we believe, the future of true scientific education in our country ; and as such this organisation deserves all the help that we can render to it.

And it is the duty of every educated Indian to support, so far as it lies in his power, the cause which Dr. Sircar's Association has been seeking to further, because, they ought to know that there is absolutely no other agency except that of modern science, that will be able to work out the salvation of their hapless country. Not only does our intellectual progress depend upon the cultivation of the Scientific Spirit—which is only another name for the Spirit of this Age—but even our economic safety and salvation, as much as our higher spirit-

ual life, depends upon the progress of scientific studies among us. The secrets of science are the only keys now that can open every treasure, and are the only weapons that can fight and conquer every foe. The race now is no longer to the swiftest, nor does victory belong any more to strength or numbers, but only to the master who can handle the secret energies of air, and water, and earth, and apply them to his own purposes. The superiority whether in political or in industrial conflicts of the European races over the Asiatics consists in the mastery that the former have gained over the forces and secrets of Nature. Once the teeming millions of Asia gain this mastery, they will be simply invincible in all the arts and crafts of civilization. Dr. Sircar saw this all; and has all his life tried to point out the way that can alone lead to the salvation of his country and his people. He has done his duty nobly and well; he has borne his share of the work bravely; it is time that others came forward to take it up at the point he has to leave it; and if only we can combine our smaller brains, and our poorer resources to carry on the noble campaign he has all his life been leading so loyally, and devotedly, it will not be possible for even the most illiberal and unsympathetic of governments to impede our progress or thwart our heaven-appointed destiny.

(*Madras Standard*, Sept. 11, 1902.)

One of the oldest and most respected Indians of the present day, a ripe patriot, and earnest worker for the true advancement of the country, Dr. Mahendra Lal Sircar, the Founder and Secretary of the Indian Association for the Cultivation of Science, celebrated last week another anniversary of his association—an anniversary which he pathetically described as probably the last he could attend in his lifetime—and made a speech full of practical hints and lofty ideas on the most burning topic of the day, the question of educational reform. Nothing is more a melancholy, perhaps often inspiriting, sight than to behold an old man, full of years and wisdom, commanding universal regard and good will, standing on a public platform and, with a heart-breaking sadness, discoursing on the final frustration of his life-long labours devoted to a single noble idea, the lamentable failure of a whole life, owing to the apathy and want of appreciation on the part of his fellow countrymen to whose sole benefit all the labours have been directed and all the sacrifice has been made. Yet such is the story with which Dr. Sircar began his able and instructive speech. His ambition was to found an institution, in which the rising generations of our country might acquire a sound training in those branches

of science which, it is becoming increasingly evident, are indispensable to the success of the nation as well as the individual amidst the keen and fierce competition of modern times. Many years ago he realised the truth—hardly realised by our countrymen and by our rulers at the present day—that a purely literary education, however highly desirable it may be from an individual and from an abstract point of view, cannot be the true foundation of national success; but that for the nation to hold its own against the most powerful rivalry of its neighbours, it must receive a high training in material science which gives the clue to the mysterious properties of matter and to their beneficial application to the moral and material progress of human beings. Dr. Sircar scouted the idea that a purely scientific training could not possess the same value as a means of culture and morality as one based on modern and classical literature, and contended that as matter is the manifestation of the Supreme Mind, so must the study of those sciences which reveal the full, latent and developed properties of this manifestation be the highest form of education and inquiry to which any Indian, any human being, can devote himself. Dr. Sircar related with a measure of pathos which must have moved all that heard him, how he had spared no means to rouse a sympathetic interest in his institution, how he tried to associate some of the dearest and most revered names with it, names such as Lord Ripon and Her late Majesty; and how he had incessantly worked, sacrificing his own profession, for the sole object of securing the support of his countrymen, and how, in spite of these, the titled and moneyed aristocracy, the middle classes, and the masses, hundreds of millions whose most vital interests were involved in the success or failure of that institution, had remained up to this day unmoved. "I have wasted a life," the old man said, his heart almost breaking under the burden of grief and disappointment, and we are afraid that the name of this enthusiastic votary of science will be remembered by posterity more by his failure than by his success in a noble effort made exclusively for the good of the country. Often failure is nobler than success, as adversity is than prosperity; and Dr. Sircar will yet leave behind him an example of devotion to a great cause which may prove a powerful incentive and an inspiration to prosperity.

On the burning topic of the hour, the recommendations of the Universities Commission, he spoke in a deep sense of disappointment and sorrow. He did not expect that at this time of the day, and under the auspices of so sympathetic and courageous a statesman now

presiding over the destinies of this country, such a lamentably reactionary measure could be possible. He rightly described as a shallow cant the poet's parody of a great truth about "little learning," which the Commission had found it convenient to adopt as its motto. Little learning is dangerous when it usurps the place of great learning. As child is the father of man, so is little learning the father of great learning. As Dr Sircar well points out, little learning and great learning are not absolute entities, but they are relative, the greatest learning of any man, be it of Socrates or Bacon, being little when compared with the vast worlds of knowledge which would always remain to be explored. The Commission forget that little learning is the portal through which the way leads to vast learning, and if they cared to be consistent they should deprecate all learning which it is possible to impart in any institution in the country. The recommendation to raise the college fees and to abolish second-grade colleges, appear to Dr. Sircar to be fraught with danger to the progress of education, and he wisely points out that if our second-grade colleges were imperfectly equipped, that was no argument for their abolition, but was an argument for their gradual improvement. It was impossible to have ideally equipped colleges in any part of the world, and "we must utilise the materials at hand in the best way we can and not aim at ideal impossibilities." That India is guilty of a grave error in its educational system and that her only salvation lies in marching along the paths along which European nations have ere now marched with such marvellous success, has long been the conviction of Dr. Sircar as it has been the conviction of others that are gifted with a true insight into the wants of India's future. Not one association for the cultivation of science, but a score of such associations in different parts of the country, are indispensable if India is to be led towards the true goal of progress, and while we amuse ourselves in silly dreams about the departed greatness of our country, and live contented with life without ambition, without manliness, guided by narrow ideals and frivolous pleasures, we as a nation are left farther and farther behind other nations, and the task of gaining anything like a firm and decent ground to stand upon becomes more and more difficult to accomplish.

(*Reis and Rayyet*, Sept 13, 1902.)

Elsewhere we publish the address of Dr. Mahendra Lal Sircar at the Indian Association for the Cultivation of Science. In his present state of health, believing that he will have no more opportunity of addressing an annual meeting, he left his bed of sickness to say his last words, and the energy with which he delivered them made him so ill that his life was almost despaired of for three days. This proves Dr. Sircar's fondness for his own child. He has recovered from that shock to his nerves, and we hope, in another twelve months, he will be himself again to take his usual place at the next annual meeting. The country will indeed be a loser, if Dr. Sircar's apprehensions about himself prove true. Let them end like the Pillay prediction about the earthquake at the close of the last month.

Dr. Sircar has suffered much, in purse and otherwise, for the Asso-

ciation, and it is not an unreasonable regret that, at the end of thirty years, he finds it no better than what it is, that it is not what it ought to have been, or what he had wished to make it. This is not the place to enquire into the reason of the failure. Dr. Sircar's belief seems to be that those of his countrymen who could, have not come forward liberally in aid of his Association. In the words of another,

The sun gives ever, so the earth
What it can give—so much 'tis worth ;
The ocean gives in many ways—
Gives baths, gives fishes, rivers, bays ;
So too the air, it gives us breath,
When it stops giving—comes in death,
Give, give, be always giving—
Who gives not is not living ;
The more you give,
The more you live.

If wealthy Indians could follow this advice, there would have been no occasion for Dr. Sircar's repeated regret, and the Science Association would have advanced the people of India considerably, if not like the Japanese. If they gave more and thus lived more, the Association would have lived to better purpose.

(*Indian Nation*, Sept. 15, 1902,)

Dr. Sircar's address at the last annual meeting of the Indian Association for the Cultivation of Science, a portion of which we print elsewhere, was conceived in a spirit of sorrow and despair. This was unfortunate, and we can only account for it by the enfeebled health and depressed vitality of the distinguished speaker. The passage which has filled *us* with sorrow is that in which he complains that he has wasted his life because the Association has not attained the measure of success which he expected and which it was entitled to. We take the liberty to offer him a consolation. His life has not been wasted. If in spite of his efforts, little or no money had been subscribed, no lecture hall had been built, no laboratory had been provided, no lectureships had been instituted, still the time, energy and resources that he has devoted to the institution would not have been wasted. It would be impertinence to remind an eminent man of science that nothing, not the smallest atom or force, is wasted in the physical universe. Every movement, every exertion of energy has effects that, though invisible, are far-reaching. If the backward chain of causes is endless, so is the prospective chain of effects. The same is true of the moral world. Nothing is wasted. People talk of success and failure, as if success were an effect and failure an absence of effect. Nothing can be a greater fallacy. Effects are various. The impalpable effects are generally more important than the material. Was Milton's energy wasted because *Paradise Lost* was not a commercial success? Was the life of Socrates wasted because an inappreciative public condemned him to death? Was Galileo's life a failure? If Dr. Sircar's work has been essentially good,—and there can be no doubt of that fact,—it will in the very nature of things have effects that are good, distant, invisible, slow perhaps, but none

the less certain and real. Dr. Sircar's good work in and for the Association is, like a good book, "the precious life-blood of a master-spirit embalmed and treasured up on purpose to a life beyond life." If a good cause does not succeed, the cause is not discredited : the fact only shows that the men of the time are incapable of appreciating it. According to Hindu ethics, work has to be done without regard to consequences. But whether we seek them or not, they do arise by an inevitable law. If we did not believe in the undying character of Karma we should find life miserable. It is only the common place that succeeds, it is only vulgar efforts that succeed. Nothing in advance of current tastes and standards succeeds. Shout with the mob, swim with the stream, write down to the vulgar taste, echo popular prejudices, act as the common herd, crouch to power, cringe to wealth, and you succeed. But rise above the crowd, kick against fashion, lash follies, spurn meanness, seek the good and the true, and the chances are that you fail. But time is eternal, and ultimately no good work does fail in any moral sense. The example, the inspiration of the work can never perish for all time. Dr. Sircar's work is not wasted, and our only regret is that he thinks it is.

(*Voice of India*, Sept. 20, 1902.)

It was a very pathetic address that the venerable Dr. Mahendra Lal Sircar delivered at the last annual meeting of the Indian Association for the Cultivation of Science, at Calcutta. The outlook seemed to him dark on all sides. He doubted if he would himself live to see another annual meeting of the Association. But science and prophecies are as the poles asunder and we earnestly hope that with all his attainments Dr. Sircar is a false prophet. He had not succeeded, he said, in endowing a single professorship in connection with the Association, and he seemed to add, with almost the remorse of a Cardinal Wolsey, that, if he had but practised his profession with half the zeal with which he had served the Association, he would to-day have been in a position to endow such an institution himself. And, lastly, the educational policy recommended by the Universities Commission, it seemed to him, threatened to cover the land with intellectual gloom. The proposals of the Commission, which he thought would be productive of harm, are those which have been disapproved practically all over India. But there is a silver lining to the cloud. He thought there was money enough in the country to endow educational institutions, as in Europe and America, and, if the whole population were of one mind, a crore of rupees would be a small sum to collect in a short time. We hope that Dr. Sircar will live to see that, if this crore is not collected, at least there need be no apprehension of higher education in this country being ruined.

(*Voice of India*, Sept. 27, 1902.)

So my good friend Dr. Mahendralal Sircar has grown despondent. Why should he? He has tried his best all his life to bring home to his countrymen the benefits of true science and of scientific education. It is no fault of his and of colleagues like Father Lafont if the

Calcutta Association for the Cultivation of Science has remained unappreciated by the generation for whom they have worked so devotedly. Appreciation is bound to come with true education; meanwhile our public workers must possess their souls in patience.

But from whom did the promoters expect substantial aid for the Association? From a short-sighted and slovenly foreign Government? Or from an apathetic and besotted aristocracy in the land? Or from an illiterate and half-starved peasantry? The educated progressive class in the country ought to have been their main support—the professional, commercial, industrial aristocrats of India—those who have made their fortunes through, and who have been able to enjoy them under, a settled Rule. Has this particular class been duly reached by Dr. Sircar? Has it been made to realise the importance of scientific knowledge, primarily to itself and then to the community at large? I should like him to make one supreme effort in this direction; if he succeeds, he may yet shame the authorities into recognizing the claims of the Association in an adequate measure. If he has really done that, and everything else that could be done in that behalf, the legitimate inference is that the Association shares the fate of other public movements in India. I, for one, shall not be surprised if it languishes for want of funds and dies ultimately of inanition.

This is how the richest and the most advanced province of the Empire supports the cause of Science! Let some one start a movement to-morrow in honour of a retiring official, and contrast the result with the fate of this Association. Look at the number of memorial funds in Bengal, raised in honour of worthy as well as unworthy men. And then let us look again at the condition of our numerous public movements, intended for the real progress of the country. It may then strike some of my readers, as it has struck me, that we have very little earnestness, very little sincerity. The only thing we seem to be in earnest about is to lower ourselves in the eyes of the world. This estimate may be wrong. Not being an Honourable Member of Council, nor a University man, nor yet a member of the National Association for Universal Amelioration, I am apt to take a narrow view of the matter. But the feeling has grown upon me of late that discussion of abstract politics has absorbed us too much to leave time for more urgently needed practical work. The workers are few; their energy is by no means superabundant. All waste of energy and resource is, therefore, to be deprecated. The ill-success of the Science Association so far is not at all creditable to the land of Sircar and Bose. On the face of it, it looks so unnatural. How else are we to account for it? And it is only one instance out of many.